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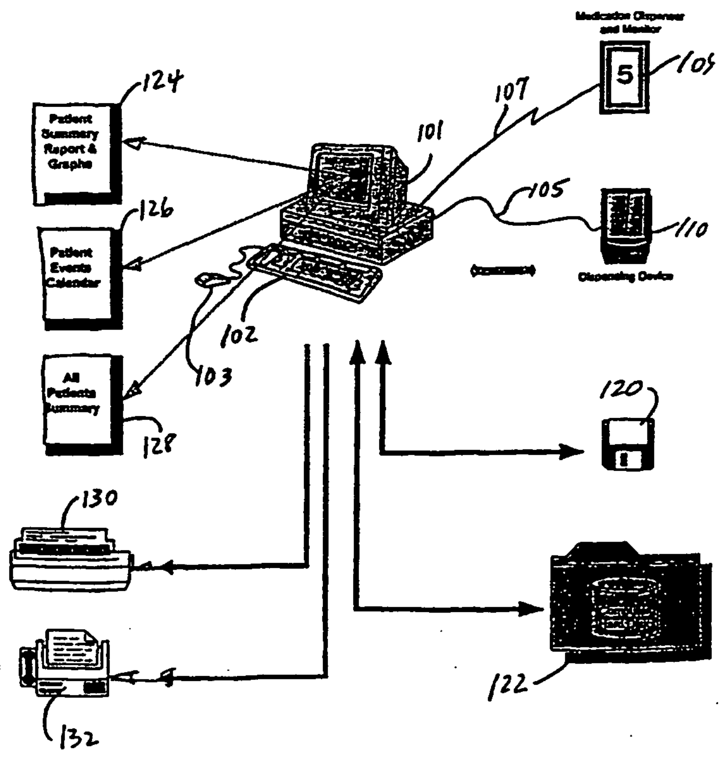
(57) Abstract

A method for managing doses of medication delivered to a patient is described. A computer system (101) receives dosage data and administration data that represent, respectively, times and quantities for taking a drug that are prescribed for a patient, and the times and quantities the drug is delivered to the patient. Based on the dosage and administration data, compliance information is generated and displayed, representing the degree to which a drug has been delivered in accordance with the dosage data. In one aspect, a calendar (126) in the form of a grid comprised of grid elements is displayed. Each grid element represents a period, such as a day in a month, and contains one or more icons. An icon's appearance indicates whether a particular dose was delivered properly, when a grid element is selected by a user, more detail is displayed about the administration of the drug for the respective day.



SYSTEM AND METHOD FOR MANAGING ADMINISTRATION OF MEDICINE RELATED APPLICATIONS

SYSTEM AND METHOD FOR MANAGING ADMINISTRATION OF MEDICINE

RELATED APPLICATIONS

This application claims priority from prior U.S. provisional application serial number 60/071,107 filed on January 12, 1998, entitled "Method and System for Monitoring Doses," which is incorporated by reference in its entirety as if fully set forth herein.

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FIELD OF THE INVENTION

The present invention relates generally to computer systems. The invention relates more specifically to managing administration of medicine, monitoring dosages of drugs given to patients, and the like.

BACKGROUND OF THE INVENTION

Monitoring dosages of drugs or medicines for patients requires communication among several levels. First, a physician must diagnose and prescribe a dosage for a patient. The medication must then be distributed accurately and, finally, the patient or a care provider must ensure that the dosages are properly administered to or taken by the patient.

For many reasons, ensuring that accurate dosages are delivered to a patient in a consistently timely manner can be difficult despite the importance of accurate administration in many instances.

Therefore, it is desirable to provide a method of automating the delivery of medicine and monitoring the delivery of medicine.

Moreover, special challenges are presented in managing patients who are taking more than one medication. Elderly patients on multiple medications may have difficulty keeping track of whether they have taken all their medications, when, and in what quantity. In the clinical setting, proper administration of multiple medications to acutely ill patients is challenging for care providers.

Thus there is a need to track multiple medications and multiple dispensing mechanisms, and to present data for all such dispensers in a report.

To facilitate the proper administration of medication and the tracking of when it is administered, medication dispensing devices are used. Conventional medication dispensing devices typically include a medicine container and an alarm mechanism which notifies a patient at the time intervals the dose(s) are due. Each time the patient opens the container, the device records the event and the time it occurred. One example of a conventional medication dispensing device is a jar with lid which incorporates an alarm mechanism and a recording mechanism. When the lid is removed, the recording mechanism records this event and the time it occurred.

One drawback to conventional dispensing devices is that they do not control access to medicine or the quantities dispensed. Thus, there is little assurance that when a dispensing device is opened, the proper amount is dispensed. Another drawback is that once opened, the dispensing devices may be re-opened immediately. Thus a confused elderly patient, having forgotten the dose they just took, may take another far too soon.

Thus, there is further need for a system that controls dispensing times and amounts and which tracks those times and amounts.

SUMMARY OF THE INVENTION

The foregoing needs, and other needs and objects that will become apparent from the following discussion, are fulfilled by the present invention, which comprises, in one aspect, a method for managing doses of medication delivered to a patient. Generally, a computer system receives dosage data and administration data. The dosage data represents a drug prescription, and includes, but is not limited to, one or more times for taking the drug, the quantities in which the drug is to be taken by the patient, or a combination thereof. The administration data represents when and in what quantities each dose in a set of doses of the drug is actually delivered to the patient. Based on the dosage and administration data, compliance information is generated and displayed. Compliance information indicates the degree to which a drug has been delivered in accordance with the dosage data. The compliance information can be displayed in variety of forms.

According to another aspect, a calendar in the form of a grid comprised of grid elements is displayed. Each grid element represents a period, such as a day in a month, and contains one or more icons. An icon's appearance indicates whether a particular dose was delivered properly. For example, a green square icon indicates that a dose was delivered on time, and a triangular red icon indicates that a dose was not delivered. When a user selects a grid element, more detail is displayed about the delivery of the drug for the respective day. In particular, a graphical object is displayed that contains one or more icons for each dose delivered in the day. An icon's position along an axis of the graphical object reflects when a dose was delivered.

According to another aspect, data is generated that specifies what portion of a set of doses was delivered properly. The data includes values that indicate what portions of the doses were delivered, and what proportion of doses were delivered on time.

According to another aspect, dosage data is transmitted to a dosage-dispensing device. The dosage data includes times and quantities to deliver a drug to a patient. In addition, data representing a lockout period may be transmitted. The dosage-dispensing device dispenses the drug to the patient in accordance with the data transmitted to it.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings and in which like reference numerals refer to similar elements and in which:

FIG. 1 is a block diagram illustrating a system for monitoring patient dosages.

FIG. 2 is a flow chart illustrating steps for a computer-implemented method for monitoring patient dosages.

FIG. 3 is a flow chart showing steps for retrieving data that is used in a system for monitoring the administration of doses to a patient.

FIG. 4 is flow chart showing steps for transmitting dosage information to a dosage-dispensing device.

FIG. 5A is block diagram depicting a calendar in the form of a grid.

FIG. 5B is a block diagram depicting a grid element and icons used to indicate patient compliance.

FIG. 5C is a block diagram depicting a graphical object used to graphically represent when doses were delivered.

Fig. 6 is a block diagram depicting a histogram showing dosage scores over period of time.

DETAILED DESCRIPTION

OVERVIEW

One embodiment is a system and method for substantially automating the administration of patient dosages, the monitoring of the delivery of doses, whether or not timely and whether or not accurate in amount, and the accumulation of data for individual patients representing administration data over an extended period of time.

Another embodiment encompasses accumulation of data for each patient from a plurality of dosage dispensing devices, and the assimilation of such data into reports which may be either specific for the particular patient, or an accumulation of data for an entire range of patients. In this way, more accurate dispensing of doses is achieved, as well as more accurate monitoring to facilitate detection of whether prescribed doses are being properly administered to the patients.

A preferred embodiment provides a computer-implemented method for monitoring patient dosages by retrieving administration data, including times and amounts of medication prescribed for a patient, retrieving patient data, including times and amounts of medication delivered for the patient, determining evaluation data by analyzing the retrieved dosing and patient data to determine compliance of the delivered medication to the prescribed medication, and displaying the evaluation data.

The method may include one or more of the following features. Patient data, including administration data, may be received from an associated device over a communications line, from local memory, or from user input. The data may be accumulated to provide a basis for patient evaluation. The patient data may be transmitted to a dosage-dispensing device, which dispenses doses to the patient in accordance with the received patient data.

The evaluation data may be displayed in a variety of ways, including display in a patient administration report that may indicate compliance of the delivered doses to the prescribed dosages. In one implementation, the data retrieved may be viewed in a scrollable tabular grid, with displayed values for all medication events, and dates, times and dose sizes dispensed from the dosage dispensing device. In addition, non-medication events may be displayed, including "bottle replaced" or other ancillary but relevant data.

Additionally, evaluation data may be displayed in the form of a patient summary report which may, for example, include all information for a particular patient including name, ID, monitoring dates, drug, brand, and so on. In addition, a histogram may be prepared summarizing the patient's compliance, including calculation of a "compliance index" or similar quantification of the patient's overall compliance with the prescribed dosing plan. The evaluation data may be displayed for varying periods, such as a week, a month, or a shorter or longer period, and may be displayed in graphical form including options for displaying doses delivered, missed, or delivered but not within compliance parameters. The data may also be displayed in calendar form.

In many instances, patients undergoing treatment may have multiple dosage dispensers. In a manner similar to the single dispenser arrangement discussed above, data for each such dispenser can be tracked and presented in a merged patient summary report. Likewise, a summary of all patients may be provided which may provide, in either graphical or tabular form, any of the selected data including name, ID, compliance index, dosage, time of day, or any other field. Histograms may also be developed across the patient class.

Evaluation data may be provided in any suitable format, such as a data file or hard copy. For example, the data may be printed or transmitted to a remote facsimile machine.

According to one embodiment, the delivery of doses of multiple patients is monitored. In this embodiment, a preferred method comprises retrieving dosage data, including times and amounts of medication prescribed for a plurality of patients, retrieving patient data, including times and amounts of medication delivered for the plurality of patients, determining evaluation data by analyzing the retrieved dosing and patient data for the plurality of patients to determine overall compliance of the delivered medication to the prescribed medications, and displaying the evaluation data.

Another embodiment includes a memory device storing computer readable instructions for aiding a computer to implement a method for monitoring patient dosages such as that described above.

Yet another embodiment provides a system for monitoring patient dosages including a computer implementing a method such as that described above.

MEDICINE ADMINISTRATION MANAGEMENT SYSTEM

Embodiments of the invention may be implemented on special purpose electronic or data processing hardware, software applications running on general purpose hardware, or a combination of both. For example, an embodiment may be implemented in a dose administration system that includes a computer system running one or more application programs that provide functions for manipulating dosing and patient data, having access through appropriate communications links to remote devices.

FIG. 1 shows an illustrative system incorporating the present invention, including personal computer 101 running application software. Computer 101 has access to both dosage data and patient data. For example, as shown in FIG. 1, the computer 101 includes a communications link 105 that couples computer 101 to dosage dispensing device 110. The dosage dispensing device 110 may be, for example, the portable medication administration device described in U.S. Patent Application Serial No. 08/ 867,010 entitled Liquid Medication Dispenser Apparatus, filed on June 2, 1997 and naming as inventors Debra L. McEnroe, Robert A. Britts, Phillippe Pouletty and Ralph Levy, the entire contents of which are hereby incorporated by reference as if fully set forth herein. Dosage dispensing device 110 may be used to dispense, for example, an analgesic drug, opiate agonist or antagonist drug, or a immunosuppressive drug, such azathioprine, Tacrolimus, Sirolimus, mycophenolate, mofetil, and their chemical derivatives,.

A portable medication administration device is a device which may be transported with the patient outside a medical facility such as a hospital or doctor's office, and which delivers multiple doses to the patient without immediate supervision by a registered medical clinician. Such dispensers are typically used by, for example, physicians and pharmacists, to input dosage data.

Communications link 105 enables the dosage data to be recorded at locations remote from the monitoring system, such as at medical facilities where medications are prescribed.

In the illustrated monitoring system, the computer 101 retrieves information relating to the patient data from data stored on diskette 120 or in a mass storage device, such as the computer's hard disk drive 122. This data typically includes a record of doses delivered to the patient and is typically created by the patient or a caretaker. As with the dosage information, this information may be input at remote locations, such as at a patient's home or a location where the medication is administered.

Of course, dosage and patient data may also be provided by alternative methods. For example, the data may be input directly by a user through the computer keyboard 102. The computer 101 can save input and retrieve information by downloading to the diskette 120 or hard drive 122, or if appropriate, may initiate to medication dispenser and monitor 109 a communications link 107. Communications link 107 may use electrical, electromagnetic, optical signals, or other signals that may carry digital data. These signals are exemplary forms of carrier waves transporting information.

Application software running on the computer 101 processes the dosage and patient data to determine monitoring information for patients. The monitoring information is provided to a user in the format of, for example, patient summary reports and graphs 124, event calendars 126, and summaries of groups of patients 128. The monitoring information can also be provided in hard copy via printer 130 or fax 132 through appropriate communication links.

Computer 110 may transmit data to dosage dispensing device 110 via communications link 105. The data may include times and quantities to administer a drug to a patient, and a value representing a lockout period. Dosage dispensing device 110 delivers a drug in accordance with the received data.

In one embodiment, computer 101 is a personal computer having an Intel or AMD-type processor and running the Microsoft® Windows 95 or Windows NT operating system, and equipped with volatile memory such as RAM and non-volatile memory such as a hard disk. A display device such as a CRT also forms part of computer 101.

MONITORING ADMINISTRATION OF MEDICINE TO A PATIENT

FIG. 2 is a diagram of a method of monitoring the administration of medicine to a patient. In one embodiment, the method of FIG. 2 is implemented in one or more application programs that are executed by computer 101.

At block 202, a computer such as personal computer 101 of the system of FIG. 1, begins execution of the application software. As shown in block 210, computer 101 retrieves dosage and patient data for a patient from stored data. As indicated by block 212, the steps of block 210 may involve retrieving previously stored data files from a mass storage device such as disk drive 122.

Alternatively, computer 101 may establish an appropriate communications link, such as a modem or ISDN line, to retrieve data from a remote device, such as the portable medication administration device illustrated in FIG. 1 and described in the above-referenced U.S. Patent Application Serial No. 867,010, filed June 2, 1997 and entitled Liquid Medication Dispenser Apparatus, previously incorporated by reference. In this alternative case, as indicated in block 214, the dispensing device 110 is connected to the computer 101 and prepared for communication with the computer.

At block 220, dosage and medicine administration information for a patient is reviewed. Specifically, updated patient data is processed by the application software and displayed as requested by a user. The application software may be adapted to manipulate the dosage and patient information as needed. For example, the software may monitor the dosages delivered to patients by recording times and amounts of doses taken by a specified patient, as indicated by the retrieved patent data. With access also to the dosage information for that patient, the software may determine, for example, compliance of a patient's delivered doses with the prescribed doses, either for specified dose times or over a period of time.

Block 220 may involve generating one or more reports, as shown by block 224. For example, the method may be used to generate calendars showing the dosing events indicating, for example, the times of prescribed doses for specific patients and whether the patient complied with those doses. The method may also generate summary reports and graphs reflecting the progress of treatment for specific patients, incorporating, for example, test results. Additionally, the method may generate summary reports for groups of patients, such as groups of patients taking the same medication or groups of patients of a specific physician.

The analyzed results may be stored and may be provided to a user. For example, the method may display the results on a computer monitor. Alternatively, as indicated in block 222, the computer 101 may provide hard copies of reports by printing to a printer or transmitting the results to a remote facsimile machine.

Optionally, as shown by block 230, the data is saved after it is reviewed. As indicated by block 232, the data is saved to the mass storage device from which it was retrieved. Alternatively, as indicated in block 234, computer 101 may clear the memory of an external device from which the data was received and save a new copy of the data, or modify appropriate parameters of the external device. A pre-defined format is used. For example, data read from the device 110 may be saved as one or more comma-delimited ASCII files on disk 122. Use of such a format enables the data to be human-readable, and allows the data to be imported into commercial, off-the-shelf application programs such as spreadsheets or word processors.

In one embodiment, the data is saved with a validation code that is computed at the time the file is saved. Whenever a saved data file is reopened, the code will be used to test and guarantee the validity of the data against corruption of the data or intentional modification by any means outside of the program. In a preferred embodiment, a relational database system such as the Microsoft Access Jet Engine is used for storing and retrieving all data.

At block 240, the operational sequence is complete.

RETREIVING PATIENT DATA - INCLUDING DOSES AND TIME DELIVERED

FIG. 3 illustrates an embodiment of a method of retrieving data. FIG. 3 illlustrates substeps involved in block 210 of FIG. 2 in greater detail.

At block 304, the computer system receives a request to read device data. For example, block 304 may involve receiving a request to read "current patient data" that is stored in the dispensing device 110. The request may be generated in response to, for example, a user selecting a program menu option in a graphical user interface ("GUI").

As shown by block 320, the system determines whether dosage or patient data for the requested patient already exists and has not been saved since a prior retrieval operation. If patient data for the requested patient already exists in memory and has not been saved during a prior retrieval, then in block 324, the system displays a prompt message to the user. The prompt message enables the user to select (1) canceling the request to retrieve patient data from the device, or (2) saving the prior data before continuing with the process of retrieving current patient data from the dosage-dispensing device. If the user chooses to cancel the request to retrieve the current patient data, then execution ends. If the user chooses to save the already existing data, then control flows to block 328, where the data is saved in a user specified file. Block 328 may involve displaying a dialog box or prompt to the user that requests the user to enter a file name or pathname. Control then flows to block 330.

At block 330, the current patient data is retrieved from the dosage-dispensing device and stored in a temporary buffer. The temporary buffer may be, for example, a temporary disk file or a buffer area in memory. At block 334, the data is checked to determine whether any transmission or data errors occurred during transmission from the dosage-dispensing device. For example, an 8-bit checksum algorithm can be applied to data received from a dispensing device 110 to detect errors. Such checksums are conventionally included by the dispensing device 110 in data that it transmits to computer 101. If any errors are detected, then at block

338, a message to the user is displayed, informing the user that errors exist in the data, and execution ends. If no transmission errors are detected, then control flows to block 340.

As indicated by block 340, the disk or other storage device is checked to determine whether any prior patient data for the patient has been retrieved and stored. If previous data has been retrieved from the device, then control flows to block 344. In this case, as shown by block 344, data for the patient is updated by merging the current patient data with the prior data. The merged data is stored in memory. A message is displayed informing the user that the merge has occurred.

As shown by block 348, the current data is stored. Alternatively, the merged data is stored, if merged data was created at block 344. The user interface is updated to reflect the addition of current patient data.

At block 360, a device retrieval dialogue is displayed, which is data about the just retrieved patient data. Such data can include patient name, the drug(s), prescribed doses per day, and the administration times.

TRANSMITTING DOSAGE DATA TO DOSAGE DISPENSING DEVICE

In one embodiment, computer 101 transmits dosage data to dosage dispensing device 110. The dosage data is used by dosage dispensing device 110 to control the dispensing of medicine. The dosage data may represent medicine to deliver, administration times, quantities, and a lockout period. A lockout period is a period of time that must elapse after dispensing a dose before another dose may be administered or delivered to the patient. The dosage data may specify medicines that include, for example, an analgesic drug, opiate agonist or antagonist drug, or a immunosuppressive drug. An example of a dosage dispensing device that receives data specifying administration times and quantities and a lock out period, and then which operates in accordance to such data, is the portable medication administration device, described in U.S. Patent Application Serial No. 867,010, filed June 2, 1997 and entitled Liquid Medication Dispenser Apparatus, previously incorporated by reference.

The ability to transmit data to a dosage device that dispenses medicine accordingly provides significant advantages. The amounts of medicine that are actually dispensed to the patient may be controlled, and premature administration of doses may be prevented.

FIG. 4 is a diagram of a method of collecting dosage data from a user, such as a physician or other clinician, and transmitting the dosage data to a dosage dispensing device.

As shown by block 410, a request is received from a user to enter dosage data. The request may be generated in response to a user selecting a program menu option in a GUI. As indicated by block 420, current dosage data for the patient is retrieved from stored data. At block 430, a data entry screen or dialog box is displayed, showing the current dosage data as the default data.

As indicated by block 440, dosage data is received from the user. The dosage data includes prescribed administration times and quantities and a lockout period. For example, the user enters the following information:

Number of Doses

Quantity and Unit

Times for Each Dose

Lock-out Period

As shown by block 450, the dosage data is transmitted to a dosage dispensing device, such as device 110 shown in FIG. 1. At block 460, the dosage data is stored in a mass storage device of a computer system, for example, hard disk 122 of computer 101.

In an embodiment of the present invention, the application software may be adapted to analyze additional data. This may include device monitoring data, such as the time a drug bottle was changed, temperature monitoring data, battery status, times data was downloaded from a dosage dispensing device, data identifying the bottle of the drug, such as data read from a bar code. Patient data may include test results measured at specified times to measure the effect of the administered dosages, or information on multiple drugs dispensed by a dosage dispensing device. Dosage data may include proper dosages of specified medications, as well as an indication of possible side effects and information regarding whether the dosage should be altered should those side effects be detected. In such a case, the application software may be adapted to provide an analysis of the effectiveness of the administered dosage.

EXEMPLARY GENERATION OF COMPLIANCE INFORMATION

To help determine whether a patient is administering a drug properly, compliance information is generated and displayed to a user. The system may display such compliance information in many forms. For example, the system may display a calendar that indicates whether particular doses were delivered properly. As another example, the system may display one or more compliance indexes, such as the percent of daily doses delivered or the percent of doses delivered on time. The compliance information may be generated by, for example, a computer system executing a computer program according to the source code set forth in the Appendix.

CALENDAR SHOWING PATIENT COMPLIANCE

FIG. 5A is a block diagram depicting a calendar 500. In the preferred embodiment, one or more calendars 500 are displayed to graphically convey user compliance information on a computer display, or other output device such as a printer.

Calendar 500 of FIG. 5A comprises a grid 502, which includes one or more grid elements 520. Each grid element 520 represents a particular day of the month, and may contain one or more icons 521 for each dose due on the particular day. The calendar 500 may also include a legend 523 that identifies each icon 521 with a descriptive label. Thus, each calendar 500 provides a snapshot display to the user of the dosages due for a particular patient throughout a particular month.

FIG. 5B shows grid element 520 in greater detail. Grid element 520 of FIG. 5B pertains to the second day of a particular month, as indicated by the numeric day value 540. Grid element 520 includes one or more icons 521 selected from among a new dosage icon 522, wrong time icon 524, on-time icon 526, and missed dose icon 528. The particular icons

521 that appear in a particular grid element 520 depend upon the content of the data previously entered for the patient by the user.

New dosage icon 522 is displayed so that it reflects the day the dosage was changed, as specified by, for example, dosing data retrieved from a dosage dispensing device 110. The new dose size may be displayed within new dosage icon 522. For example, new dosage icon 522 may include text showing that the dosage is "250 mg".

Preferably, wrong time icon 524, and missed dose icon 528 each are displayed with different patterns that indicate whether a dose was delivered properly. For example, wrong time icon 524 is a square shaped icon that is displayed in a first color, such as brown or tan, and is displayed for a dose that was delivered at the wrong time. A dose is delivered at the wrong time if it was delivered to the patient at a time outside the scheduled administration time.

Similarly, on-time icon 526 may be a green colored icon, and is displayed for a dose that was delivered on time. A dose is delivered on time if it was delivered to the patient within the scheduled administration time.

Missed dose icon 528 is a circular icon displayed, for example, in red, and has a thick border. The missed dose icon 528 indicates that a patient failed to take a scheduled dose.

The colors and shapes of the icons 521 disclosed herein are not required and are not important. What is important is that a wrong time dose, on time dose, and missed dose each are represented by a unique icon or symbol. In addition, another row of icons can be displayed in each grid element to indicate the number of doses due, each icon representing a scheduled dose for a day.

In one embodiment, each of the grid elements in grid 520 are graphical user controls. A user may cause the computer to display more information about a particular day reflected in grid 502 by manipulating the day's respective grid element. For example, a user, using mouse 103 as an input device, moves a mouse cursor of calendar 500 onto the day's respective grid element and then clicks the mouse. In response, computer 101 displays a graphical time line with icons positioned to reflect when the drug was delivered.

FIG. 5C depicts an exemplary graphical time line. Time line 550 is a graphical image having a horizontal length that reflects one 24-hour day. One or more icons 562 each represent a dose delivered for a particular day. Each of the icons 562 are displayed along the horizontal axis 564 of time line 550 so that their respective positions along the horizontal axis of time line 550 reflects when they were delivered. One or more hour labels 566 indicate the time at which a dose was delivered. For example, icon 562 represents a dose that was delivered at approximately 8:00 a.m., as indicated by hour label 568.

In one embodiment, icons 562 may include icons for missed doses. Such icons may be displayed using a different pattern than those used to represent doses delivered on time. In addition, icons representing doses delivered at the wrong time can be displayed using a third pattern.

COMPLIANCE INDEXES

Compliance information can also be provided in the form of compliance indexes. A compliance index is a set of one or more values that reflects the degree to which the actual delivery of a drug complies with the prescribed administration. A variety of compliance indexes may used.

For example, the compliance indexes may include a dosage-on-time index. The dosage-on-time index reflects the percent of doses that were delivered to the patient on time in a given period. For example, assume that a drug is prescribed to be administered three times a day, at 7:00 a.m., 3:00 p.m., and 11:00 p.m., plus or minus an hour. If for a given day the drug is in fact delivered twice at 8:00 a.m. and 6:00 p.m., then the dosage-on-time index for the day is thirty-three percent (33%).

A dose-per-day index reflects the percentage of prescribed doses that were at least delivered in a given period. In the previous example, the dose-per-index would be sixty-six percent (66%) because two out of three doses were delivered in the day.

A unit-per-day-index reflects what portion of the amount of a drug prescribed for a day was delivered to the patient. For example, 2000 mg may be prescribed, but 2200 mg may be delivered to the patient. Thus, the unit-per-day-index would be 110%.

The user may specify the period covered by a compliance index in a variety of ways. For example, a graphical user control list box may provide selectable list box items which each represent a period for which to generate a compliance index. One list box item specifies the last week, another the last two weeks, and another the previous month. In addition, the graphical user control text boxes can be configured to accept the beginning and end dates of a period.

Also, various techniques may be used to display compliance indexes to the user. Each index can be displayed as a numeral, or a graphic, such as a horizontal bar. The length of the bar would represent 100 percent, and a position of an indicator along the length would indicate a percent.

One or more compliance indexes may be presented in the form of a weekly dosing graph, as shown in FIG. 5C, or in other graph forms, such as a line, area, and histogram graph. In addition, a GUI may present a graphical user control through which a user may select the form of the graph for displaying compliance indexes. For example, a GUI may display a graphical user control list box containing list box items for each graph form. By selecting one of the list box items, a user specifies a graph form for displaying a compliance index.

Fig. 6 shows a score histogram graph according to an embodiment of the present invention. Score histogram graph 600 displays patient dosing scores in the form of a graph of "Time Span" versus "Score." The time span is selectable for a time range specified by the user. The score value represents a compliance index over, for example, the last 7, 14, 21, or 28 days, or a time span specified by the user.

Score histogram graph 600 contains one or more graphical bars, such as graphical bar 610. Each graphical bar is used to reflect a dosage score for a time period within the time span, such as a day. To measure the graphical bars, score histogram graph 600 includes graphical score scale 604. The height of the graphical bars together with graphical score scale 604 indicate a dosage score for a particular time period. Graphical bar 610 reflects a score of 66%.

OTHER REPORTS

Other reports can be generated based on the foregoing information.

In particular, a Patient Dosing Report is generated based on data retrieved from the dispenser device 110. The data is displayed in a scrollable tabular grid. Displayed values include all medication events, dates, times, and dose sizes that are retrieved from the dispenser. Other non-medication events that are reported from the dispenser device to the computer 101 can be displayed at the option of the user. For example, when a user replaces a bottle in the dispenser, the dispenser device 110 reports a "bottle replaced" event to the computer 101. Such events can appear in the Patient Dosing Report.

As another example, a Patient Summary Report is generated. The report includes a header containing complete patient information such as Name, ID, Monitoring Dates, Drug, Brand, etc.

A Patient Summary Report, based on the merged data created in block 344 of FIG. 3, can be generated. The report summarizes data downloaded from multiple devices for the same patient.

A Summary of All Patients report presents a summary of all patients in grid form. The grid includes Name, ID, and Score for each patient. The grid may be sorted by any column. The Score value may be selected based on Doses Per Day or Time Of Day.

Preferably, the system provides a Print Preview function whereby the user can view any pages on the screen before they are printed.

PROGRAM STRUCTURE

Embodiments of the methods described further below may be implemented, for example, in one or more computer programs developed using Microsoft Visual Basic®. Preferably, the programs provide a multi-document interface whereby a user may view multiple documents simultaneously within the program. For example, the calendar dialog and medication event data dialogs described herein may be viewed at the same time.

In one embodiment, the program functions and method steps described above are organized in an application program using one or more pull-down menus, each of which has one or more menu options. Table 1 presents a hierarchy of menu options in one embodiment of such a program.

TABLE 1 -- MENU OPTIONS

FILE

- New
- Open
- Save ...
- Save As ...
- Print Setup ...

- Print Preview ...
- Print ...
- Exit ...

DEVICE
- Retrieve Dispenser Data
- Program Dispenser

VIEW
- Dosing Data
- Dosing Calendar
- Reports & Graphs ...

HELP
- About

The application program may also provide confirmation dialogs that prompt the user to verify various functions, such as dosing, as they are performed and where appropriate.

In the foregoing specification, the invention has been described with reference to specific embodiments thereof. It will, however, be evident that various modifications and changes may be made thereto without departing from the broader spirit and scope of the invention. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense.

APPENDIX

CycloTech Medication Monitoring Program

SangStat Medical Corporation

Produced by Glen Hamilton, Cyber Innovations Corporation

Code Listing From
3/19/98

Table Of Contents

1

```
Attribute VB_Name = "modGeneral"
Option Explicit

'Declare DLL calls
Declare Function OSWinHelp% Lib "user32" Alias "WinHelpA" (ByVal hWnd&, ByVal HelpFile$, ByVal wCommand%, dwData As Any)
Declare Function GetPrivateProfileInt Lib "kernel32" Alias "GetPrivateProfileIntA" (ByVal lpApplicationName As String, ByVal lpKeyName As
↳ String, ByVal nDefault As Long, ByVal lpFileName As String) As Long
Declare Function GetPrivateProfileString Lib "kernel32" Alias "GetPrivateProfileStringA" (ByVal lpApplicationName As String, ByVal
↳ lpKeyName As Any, ByVal lpDefault As String, ByVal lpReturnedString As String, ByVal nSize As Long, ByVal lpFileName As String) As
↳ Long
Declare Function WritePrivateProfileString Lib "kernel32" Alias "WritePrivateProfileStringA" (ByVal lpApplicationName As String, ByVal
↳ lpKeyName As Any, ByVal lpString As Any, ByVal lpFileName As String) As Long

'Set up some temporary buffers for getting strings from DLL calls
Public Const giBufSize1024 = 1024          'set size of input buffer for strings
Public gsTempBuf As String               'input buffer for strings (defined at program start)

Public giLatestOptionsTabSelected As Integer      'keep track of the tab that was last selected by user (goes back to it next time it is
↳ opened)
Public gsLastStartDateChosen As String       'a starting plot date last selected by user
Public gsLastEndDateChosen As String         'an ending plot date last selected by user
Public gsLastDateSet As String            'a temp string used to pass dates back and forthe to the calendar
Public gsDateDisplayFormat As String          'holds the user's choice for the displayed date format for dialogs and reports
Public gsTimeDisplayFormat As String          'holds the user's choice for the displayed time format for dialogs and reports
Public gsCustomLblPatientLastName As String        'replacement labels for the dialogs if exist in config file.
Public gsCustomLblPatientFirstName As String       'replacement labels for the dialogs if exist in config file.
Public gsCustomLblPatientID As String
Public gsCustomLblTxCenter As String
Public gsCustomLblDrug As String
Public gsCustomLblOrgan As String
Public gsLabelGridColumnCustom1 As String
Public gsLabelGridColumnCustom2 As String
Public gsLabelGridColumnCustom3 As String

'This value is stored in device & indicates the version of data structure within the device.
'This does not relate directly to the version of the host software because the host software
'version can change with meaning that the structure of the data in the device has changed.
'This value should be increased when any kind of change occurs to the custom areas of the device
'such as changing the length of strings to accommodate new features. The purpose of this value
'is to let us read it back from a device and determine if newer host software is being used on
'a device programmed with another version.

Public Const gsREV_DATA_STRUCTURE = "01"

'There are 4 fields in the device containing 16 characters each.  In the original
'device design, this was intended to contain 4 sepeate pieces of information.
'The length of each data type is as follows:
Public Const giLEN_REV_DATA_STRUCTURE = 2
Public Const giLEN_PATIENT_NAME = 26
Public Const giLEN_ID = 11
Public Const giLEN_DRUG = 2
Public Const giLEN_TX_CENTER = 18
Public Const giLEN_ORGAN = 2

Public Const giMaxDoseTimes = 4            'the max number of prescribed dosing time (entry boxes)
Public Const giDosesPerDayDefault = 2
Public gbPatientDataNotSaved As Boolean         'true once the data in memory has been saved (from device)

Public gdTempDateTime As Double              'rgh. put this var in the form that uses it, can also be done
Public giTempCya As Integer
Public gfTempCreatinine As Single
Public gsTempCustomInfo As String

Public gsActiveFormName As String
```

2

```
Public giCurrentTip As Integer          'most recent tip number that was shown
Public gsWebStartingAddress As String     'url address and any associated password for web site
```

```
Public Function ComputeIniSectionChecksum(ByVal sFileSpec As String, ByVal sSection As String)
  'Read each line in the section name of an INI file that was passed here.
  'Compute a unique value and pass back to caller
  On Error GoTo 0   'rgh temp

  Dim lCheckSumTally As Long, r As Integer, l As Long, i As Integer, iKey As Integer
  Dim sLine As String

  'Get the names of all of the keys in this section.
  'A null key field in above line loads all keys in that section
  Dim iStrSize As Integer, sTempBuf As String, lBufSize As Integer
  Dim sKeyList(2000) As String     'make room for this many key names in this section

  sTempBuf = Space$(16384)
  lBufSize = 16384
  l = GetPrivateProfileString(sSection, ByVal 0&, "", sTempBuf, lBufSize, sFileSpec)
  r = ParseDelimString(Left$(sTempBuf, l), Chr$(0), sKeyList())     'put the key names in a list
  For iKey = 1 To r
    sLine = GetINISetting(sFileSpec, sSection, sKeyList(iKey), "")
    For i = 1 To Len(sLine)
      lCheckSumTally = lCheckSumTally + (Asc(Mid$(sLine, i, 1)) * iKey)
    Next i
  Next iKey
  lCheckSumTally = lCheckSumTally Mod 536870912      'a 29 bit number

  ComputeIniSectionChecksum = lCheckSumTally      'pass result back to caller

End Function
```

```
Public Sub EventDelete(DataStruct As DeviceDataStruct, ByVal iIndex As Integer)
  'Remove an event from the data structure.  The index to the position is
  'passed here.

  Dim i As Integer

  'it is not a valid index
  If iIndex < 1 Or iIndex > DataStruct.lEventData(0) Then Exit Sub

  For i = iIndex To DataStruct.lEventData(0)          'move all events up one
    DataStruct.byteEventType(i) = DataStruct.byteEventType(i + 1)
    DataStruct.dEventDate(i) = DataStruct.dEventDate(i + 1)
    DataStruct.lEventData(i) = DataStruct.lEventData(i + 1)
  Next i

  DataStruct.lEventData(0) = DataStruct.lEventData(0) - 1     'decrement event count
  gbPatientDataNotSaved = True     'set flag to indicate that the file has changed but not yet been saved

End Sub
```

```
Public Sub EventInsert(DataStruct As DeviceDataStruct, ByVal iIndex As Integer, ByVal dDate As Double)
  'Insert a new event into the data structure at the index location passed here.  If the index =0
  'then it probably indicates that a previous function could not find where to insert the date
  'in the structure.  In this case, the event must be inserted at the beginning or the end of the
  'structure depending on the date.

  Dim I As Integer

  If iIndex = 0 Then     'date was not found
    If dDate <= DataStruct.dEventDate(1) Then
      iIndex = 1
    Else
      iIndex = DataStruct.iEventData(0)     'insert at last point
    End If
  End If

  If iIndex Then     'there are events in the structure
    For I = DataStruct.iEventData(0) To iIndex Step -1       'move all events down to make room for new one
      DataStruct.byteEventType(I + 1) = DataStruct.byteEventType(I)
      DataStruct.dEventDate(I + 1) = DataStruct.dEventDate(I)
      DataStruct.iEventData(I + 1) = DataStruct.iEventData(I)
      DataStruct.sUserData1(I + 1) = DataStruct.sUserData1(I)
      DataStruct.sUserData2(I + 1) = DataStruct.sUserData2(I)
      DataStruct.sUserData3(I + 1) = DataStruct.sUserData3(I)
    Next I
  Else
    iIndex = iIndex + 1
  End If

  'Now insert the new event
  DataStruct.iEventData(0) = DataStruct.iEventData(0) + 1      'increment event count
  DataStruct.byteEventType(iIndex) = giEVENT_USER_DEFINED
  DataStruct.dEventDate(iIndex) = dDate
  DataStruct.sUserData1(iIndex) = gfTempCya              'put change in structure
  DataStruct.sUserData2(iIndex) = gfTempCreatinine        'put change in structure
  DataStruct.sUserData3(iIndex) = gsTempCustomInfo          'put change in structure

  If iIndex = 1 Then   'there were no previous events until this one
    DataStruct.iEventData(iIndex) = 0
  Else
    DataStruct.iEventData(iIndex) = DataStruct.iEventData(iIndex - 1)
  End If
  gbPatientDataNotSaved = True     'set flag to indicate that the file has changed but not yet been saved

End Sub
```

```
Public Function FindPrescibedDoseSizeForSpecificDay(DataStruct As DeviceDataStruct, ByVal lDate As Long)

  'Find the prescribed dose for the day that is passed here.
  'This is accomplished by looking for the most recent dose change
  'event that occurred on or prior to this date.

  Dim I As Integer, iIndex As Integer
  iIndex = FindClosestDateInArray(DataStruct, lDate)
  If iIndex = 0 Then    'all events are occurring after the date requested
    For I = 1 To DataStruct.iEventData(0)      'look through whole array if necessary
      If DataStruct.byteEventType(I) = giEVENT_DOSE_CHANGED Then
        FindPrescibedDoseSizeForSpecificDay = I      'DataStruct.iEventData(I)
        Exit For
      End If
    Next I


  Else  'an event date was found
    For I = iIndex To 1 Step -1
      If DataStruct.byteEventType(I) = giEVENT_DOSE_CHANGED Then
```

```
            FindPrescibedDoseSizeForSpecificDay = i     'DataStruct.iEventData(i)
            Exit For
        End If

      Next I
    End If

End Function
```

```
Public Function CalcDayDoseScore_OnTime(DataStruct As DeviceDataStruct, ByVal lStartingDate As Long) As
  'Computer the dosing score for the day passed here.
  'This score tests to see if the dosen taken was within the prescribed time range.
  'Pass the score back to the caller as nearest whole percent.
  'lindex is the index in the array where computation is to start.
  'It should already be set to the first event that occurred on that day.

  Dim I As Long, I As Integer, iTotalDoses As Integer
  Dim lIndex As Integer, r As Integer

  lIndex = FindClosestDateInArray(DataStruct, lStartingDate)     'returns 0 if date is not found
  If lIndex Then    'an event was found
    Do   'look at all past events for the past iScoreDays
      If Int(DataStruct.dEventDate(lIndex)) = lStartingDate Then
        'date still in range, ok to continue
        If DataStruct.byteEventType(lIndex) = giEVENT_DOSE_TAKEN Then    'this is a medication
          'Now test to see if time is within the daily prescribed range
          r = IsDoseWithinPrescribedTimeRange(DataStruct, lIndex)     'pass index to event time
          If r Then iTotalDoses = iTotalDoses + 1
        End If
        lIndex = lIndex + 1
      Else
        Exit Do
      End If
    Loop

    CalcDayDoseScore_OnTime = 100 * iTotalDoses / DataStruct.iDosesPerDay

  End If

End Function
```

```
Public Function CalcDayDoseScore_AllDoses(DataStruct As DeviceDataStruct, ByVal lStartingDate As Long) A
  'Computer the dosing score for the day passed here.
  'Calculate for all doses taken on that day regardless of if they were taken on time or not.
  'Pass the score back to the caller as nearest whole percent.
  'lIndex is the index in the array where computation is to start.
  'It should already be set to the first event that occurred on that day.

  Dim iTotalDoses As Integer, lIndex As Integer

  lIndex = FindClosestDateInArray(DataStruct, lStartingDate)
  If lIndex Then    'an event was found on this date
    Do   'look at all dosing events for this day
      If Int(DataStruct.dEventDate(lIndex)) = lStartingDate Then
      'date still in range. ok to continue
      'this is a medication
      If DataStruct.byteEventType(lIndex) = giEVENT_DOSE_TAKEN Then iTotalDoses = iTotalDoses + 1
        lIndex = lIndex + 1
      Else
        Exit Do
      End If
    Loop

    CalcDayDoseScore_AllDoses = 100 * iTotalDoses / (DataStruct.iDosesPerDay)
  End If
End Function

Public Function CalcDosesSumTakenOnSpecificDay(DataStruct As DeviceDataStruct, ByVal lStartingDate As I
   'Computer the dosing total number of doses taken on a specific date
   'Note, this calculation does not take into consideration whether or not the dose
   'was taken within the prescribed time. This is all doses for a particular day
   'Pass the count back to the caller.

   Dim iTodayDoseCount As Integer, iIndex As Integer

   iIndex = FindFirstMatchingDateInArray(DataStruct, lStartingDate)
   If iIndex Then   'an event was found on this date
      Do   'look at all dosing events for this day
         If Int(DataStruct.dEventDate(iIndex)) = lStartingDate Then
            'date still in range, ok to continue
            'this is a medication
            If DataStruct.byteEventType(iIndex) = giEVENT_DOSE_TAKEN Then iTodayDoseCount = iTodayDoseCount + 1
            iIndex = iIndex + 1   'goto next higher event in array
            'exit if at end of array (prevents error)

            If UBound(DataStruct.dEventDate()) = iIndex Then Exit Do

            'exit if no data in array
            If iIndex > Int(DataStruct.iEventData(0)) Then Exit Do

         Else
            Exit Do
         End If
      Loop

      CalcDosesSumTakenOnSpecificDay = iTodayDoseCount
   End If

End Function

Public Sub EraseDataInMemory(DataStruct As DeviceDataStruct)
   Dim I As Integer

   'clear out any data that may be in memory and initialize the arrays
   DataStruct.sPatientLastName = ""
   DataStruct.sPatientFirstName = ""
   DataStruct.sPatientID = ""
   DataStruct.sDrug = ""
   DataStruct.sOrgan = ""
   DataStruct.sTxCenter = ""
   DataStruct.sSerialNumber = ""
   DataStruct.sFirmwareVer = ""
   DataStruct.sDoseSize = ""
   DataStruct.sPatientDataFileName = ""

   For I = 0 To giMaxDoseTimes
      DataStruct.dPrescribedDoseTime(I) = -1
   Next I

   DataStruct.iDosesPerDay = 0
   DataStruct.sDoseResolution = ""
   DataStruct.sMedRemaining = ""

   Erase DataStruct.sScoreData
   Erase DataStruct.iEventData
   Erase DataStruct.dEventDate
   Erase DataStruct.byteEventType   'erases all elements of a fixed array

   Erase DataStruct.sUserData1
   Erase DataStruct.sUserData2
```

```
    Erase DataStruct.sUserData3

    DataStruct.lDeviceInitDate = 0
    DataStruct.sBatteryChangeTimer = ""
    DataStruct.sDoseLockoutHours = ""

    DataStruct.bErrorFatal = False
    DataStruct.bErrorNonFatal = False
    DataStruct.bErrorDoseSize = False
    DataStruct.bErrorMedRemaining = False
    DataStruct.bErrorMemoryFull = False
    DataStruct.bErrorsExist = False
    DataStruct.bErrorBrownOut = False
    DataStruct.dLastDownloadDate = 0

    gbPatientDataNotSaved = False

End Sub
```

```
Public Sub CreateTxtSummaryFile()
    'This routine creates a temp text file in the "fax" subdirectory
    'This will allow the information to be faxed as a text document.

    Dim I As Integer, r As Integer, sFileSpec As String, lErrorCode As Long
    Dim sLblName As String, sLblID As String, sLblTxCenter As String, sLblDrug As String, sLblOrgan As String

    'Get rid of the previous temporary file.
    'sFileSpec = App.Path + "\faxes\temp.txt"
    sFileSpec = App.Path + "\faxes\" + PAT_DATA.sPatientLastName + ", " + PAT_DATA.sPatientFirstName + " " + PAT_DATA.sPatientID + ".
     txt"
    r = FileExists(sFileSpec, lErrorCode)
    If r Then Kill sFileSpec

    sLblName = gsCustomLblPatientLastName
    sLblID = gsCustomLblPatientID
    sLblTxCenter = gsCustomLblTxCenter
    sLblDrug = gsCustomLblDrug
    sLblOrgan = gsCustomLblOrgan

    Open sFileSpec For Output Shared As #1
    Print #1, sLblName + ":  " + PAT_DATA.sPatientLastName + " " + PAT_DATA.sPatientFirstName
    Print #1, sLblID + ":  " + PAT_DATA.sPatientID
    Print #1, sLblTxCenter + ":  " + PAT_DATA.sTxCenter
    Print #1, sLblDrug + ":  " + PAT_DATA.sDrug
    Print #1, sLblOrgan + ":  " + PAT_DATA.sOrgan
    Print #1,
    Print #1, "Device Serial Number:  " + PAT_DATA.sSerialNumber
    Print #1, "FirmWare Version:  " + PAT_DATA.sFirmwareVer
    Print #1, "Last Download Date:  " + Format$(PAT_DATA.dLastDownloadDate, gsDateDisplayFormat)
    Close #1

    'rgh ensure that the complete file is printed

End Sub
```

```
Function FileExists(ByVal sPath As String, lErrorCode As Long) As Integer
' Check for existence of a file by attempting an OPEN.
' Return true (-1) if exists else return False (0) or error condition
' Note that since this function tries to open a file, an error could
' return to caller if file is there but in use by another application.
'------------------------------------------------

    Dim X As Integer

    X = FreeFile
    On Error Resume Next
    Open sPath For Input As X
    Close X
    If Err = 0 Then
        FileExists = True
        lErrorCode = 0          'clear error code
    Else
        FileExists = False      'set flag for error
        lErrorCode = Err        'pass error back to caller
    End If

End Function
```

```
Public Function GetINISetting(sFileSpec As String, sSection As String, sKeyField As String, sDefault As String
    Dim lStrSize As Integer, sTempBuf As String, lBufSize As Integer
    sTempBuf = Space$(1024)
    lBufSize = 1024

    lStrSize = GetPrivateProfileString(sSection, sKeyField, sDefault, sTempBuf, lBufSize, sFileSpec)
    If lStrSize Then
        GetINISetting = Trim$(Left$(sTempBuf, lStrSize))
    Else
        GetINISetting = sDefault
    End If

End Function
```

```
Public Function GetPatientDataFromDisk(ByVal sFileSpec As String, DataStruct As DeviceDataStruct, lErrorRe

    'Get all of the patient data from the file on disk and place into memory.
    'The filename that is passed here must be a valid patient file and verified
    'by the calling procedure.
    Dim sSection As String, i As Integer, sTemp As String, r As Integer
    Dim lFileChecksum As Long, lCheckSumTally As Long

    On Error GoTo GetPatientDataFromDisk_Error

    'Read the file and calculate the checksum.
    lFileChecksum = ComputeIniSectionChecksum(sFileSpec, "Device Data")
    lCheckSumTally = GetINISetting(sFileSpec, "General", "Device Data Validation", 0)
    If lFileChecksum <> lCheckSumTally Then
        lErrorReturn = ERR_DATA_CHECKSUM
        Exit Function
    End If

    lFileChecksum = ComputeIniSectionChecksum(sFileSpec, "Event Data")
    lCheckSumTally = GetINISetting(sFileSpec, "General", "Event Data Validation", 0)
    If lFileChecksum <> lCheckSumTally Then
        lErrorReturn = ERR_DATA_CHECKSUM
        Exit Function
    End If
```

```
lFileChecksum = ComputeIniSectionChecksum(sFileSpec, "Device Error Flags")
lCheckSumTally = GetINISetting(sFileSpec, "General", "Device Error Flags Validation", 0)
If lFileChecksum <> lCheckSumTally Then
   lErrorReturn = ERR_DATA_CHECKSUM
   Exit Function
End If


sSection = "Device Error Flags"
DataStruct.bErrorFatal = CBool(GetINISetting(sFileSpec, sSection, "Fatal", False))
DataStruct.bErrorNonFatal = CBool(GetINISetting(sFileSpec, sSection, "Non Fatal", False))
DataStruct.bErrorDoseSize = CBool(GetINISetting(sFileSpec, sSection, "Dose Size", False))
DataStruct.bErrorMedRemaining = CBool(GetINISetting(sFileSpec, sSection, "Med Remaining", False))
DataStruct.bErrorMemoryFull = CBool(GetINISetting(sFileSpec, sSection, "Memory Full", False))
DataStruct.bErrorBrownOut = CBool(GetINISetting(sFileSpec, sSection, "Brownout", False))


sSection = "Device Data"
EraseDataInMemory DataStruct

sTemp = GetINISetting(sFileSpec, sSection, "Device Init Date", 0)
If IsDate(sTemp) Then
   DataStruct.lDeviceInitDate = DateValue(sTemp)
End If

sTemp = GetINISetting(sFileSpec, sSection, "Events Ref Date Time", 0)
If IsDate(sTemp) Then
   DataStruct.dDeviceRefDateTime = DateValue(sTemp)
End If

sTemp = GetINISetting(sFileSpec, sSection, "Last Download Date", "0")
If IsDate(sTemp) Then
   DataStruct.dLastDownloadDate = DateValue(sTemp)
End If

DataStruct.sPatientLastName = GetINISetting(sFileSpec, sSection, "Last Name", "")
DataStruct.sPatientFirstName = GetINISetting(sFileSpec, sSection, "First Name", "")
DataStruct.sPatientID = GetINISetting(sFileSpec, sSection, "Patient ID", "")
DataStruct.sTxCenter = GetINISetting(sFileSpec, sSection, "Tx Center", "")
I = CInt(GetINISetting(sFileSpec, sSection, "Organ Reference Number", "0"))
If I And I <= UBound(gsOrganNames) Then DataStruct.sOrgan = gsOrganNames(I)
I = CInt(GetINISetting(sFileSpec, sSection, "Drug Reference Number", "0"))
If I And I <= UBound(gsDrugNames) Then DataStruct.sDrug = gsDrugNames(I)
DataStruct.sSerialNumber = GetINISetting(sFileSpec, sSection, "Serial Number", "")
DataStruct.sFirmwareVer = GetINISetting(sFileSpec, sSection, "Firmware Version", "")
DataStruct.sDoseSize = GetINISetting(sFileSpec, sSection, "Dose Size", "")
DataStruct.lDosesPerDay = CInt(GetINISetting(sFileSpec, sSection, "Doses Per Day", "0"))
DataStruct.sDoseResolution = GetINISetting(sFileSpec, sSection, "Dose Resolution", "")
DataStruct.sMedRemaining = GetINISetting(sFileSpec, sSection, "Medication Remaining", "")
DataStruct.sBatteryChangeTimer = GetINISetting(sFileSpec, sSection, "Battery Change Timer", "")
DataStruct.sDoseLockoutHours = GetINISetting(sFileSpec, sSection, "Lockout Hours Between Doses", "")

For I = 1 To 14
   DataStruct.sScoreData(I) = GetINISetting(sFileSpec, sSection, "Patient Score Data " + CStr(I), "")
Next I


For I = 1 To giMaxDoseTimes
   sTemp = GetINISetting(sFileSpec, sSection, "Prescribed Dose Time " + CStr(I), "-1")
   DataStruct.dPrescribedDoseTime(I) = -1        ' default value
   If IsDate(sTemp) Then DataStruct.dPrescribedDoseTime(I) = CDate(sTemp)
Next I

DataStruct.iEventData(0) = CInt(GetINISetting(sFileSpec, "Event Data", "Event Count", "0"))

Dim sTempList(10) As String
For I = 1 To DataStruct.iEventData(0)
```

```
      sTemp = GetINISetting(sFileSpec, "Event Data", CStr(i), "")
      r = ParseDelimString(sTemp, ",", sTempList())
      DataStruct.dEventDate(i) = CDate(sTempList(1))
      Select Case Trim$(LCase$(sTempList(2)))
        Case "dose taken"
          DataStruct.byteEventType(i) = giEVENT_DOSE_TAKEN
          DataStruct.lEventData(i) = sTempList(3)

        Case "dose change"
          DataStruct.byteEventType(i) = giEVENT_DOSE_CHANGED
          DataStruct.lEventData(i) = sTempList(3)

        Case "custom event"
          DataStruct.byteEventType(i) = giEVENT_USER_DEFINED
          DataStruct.lEventData(i) = sTempList(3)

      End Select
      DataStruct.sUserData1(i) = sTempList(4)
      DataStruct.sUserData2(i) = sTempList(5)
      DataStruct.sUserData3(i) = sTempList(6)
    Next i

    '   bErrorFatal As Boolean        'true if this flag was set in the returned flags string
    '   bErrorNonFatal As Boolean     'true if this flag was set in the returned flags string
    '   bErrorDoseSize As Boolean     'true if this flag was set in the returned flags string
    '   bErrorMedRemaining As Boolean 'true if this flag was set in the returned flags string
    '   bErrorMemoryFull As Boolean   'true if this flag was set in the returned flags string
    '   bErrorBrownOut As Boolean     'true if this flag was set in the returned flags string
    '   bErrorsExist As Boolean       '(1 byte) Bits are set if various errors have occurred and have not
    GetPatientDataFromDisk = True     'return success flag to caller

GetPatientDataFromDisk_Exit:
    Exit Function

GetPatientDataFromDisk_Error:
    lErrorReturn = Err
    Resume GetPatientDataFromDisk_Exit

    End Function
```

```
Public Sub GetProgramPreferences()
    'Load the program and user preferences into the global variables
    Dim lStrSize As Integer, I As Integer, sFileSpec As String, r As Integer
    Dim sSection As String
    sSection = "Preferences"
    gsDateDisplayFormat = GetINISetting(gsAppIniFileSpec, sSection, "Date Display Format", "Short Date")
    gsTimeDisplayFormat = GetINISetting(gsAppIniFileSpec, sSection, "Time Display Format", "Short Time")
    gsngComplianceTimeRange = CSng(GetINISetting(gsAppIniFileSpec, sSection, "Compliance Time Range", "2"))

    sSection = "Custom Settings"
    'Get any custom field labels that may be in the INI file.  If none exist the set some defaults here.
    gsCustomLblPatientLastName = GetINISetting(gsAppIniFileSpec, sSection, "Last Name Label", "")
    If gsCustomLblPatientLastName = "" Then gsCustomLblPatientLastName = "Last Name"

    gsCustomLblPatientFirstName = GetINISetting(gsAppIniFileSpec, sSection, "First Name Label", "")
    If gsCustomLblPatientFirstName = "" Then gsCustomLblPatientFirstName = "First Name"

    gsCustomLblPatientID = GetINISetting(gsAppIniFileSpec, sSection, "Patient ID Label", "")
    If gsCustomLblPatientID = "" Then gsCustomLblPatientID = "Patient ID"

    gsCustomLblTxCenter = GetINISetting(gsAppIniFileSpec, sSection, "TX Center Label", "")
    If gsCustomLblTxCenter = "" Then gsCustomLblTxCenter = "TX Center"

    gsCustomLblDrug = GetINISetting(gsAppIniFileSpec, sSection, "Drug Label", "")
    If gsCustomLblDrug = "" Then gsCustomLblDrug = "Drug"
```

```
gsCustomLblOrgan = GetINISetting(gsAppIniFileSpec, sSection, "Organ Label", "")
If gsCustomLblOrgan = "" Then gsCustomLblOrgan = "Organ"

gsLabelGridColumnCustom1 = GetINISetting(gsAppIniFileSpec, sSection, "Grid Column 1", "")
If gsLabelGridColumnCustom1 = "" Then gsLabelGridColumnCustom1 = "CYA Level (ng/ml)"

gsLabelGridColumnCustom2 = GetINISetting(gsAppIniFileSpec, sSection, "Grid Column 2", "")
If gsLabelGridColumnCustom2 = "" Then gsLabelGridColumnCustom2 = "Creatinine (mg/dl)"

gsLabelGridColumnCustom3 = GetINISetting(gsAppIniFileSpec, sSection, "Grid Column 3", "")
If gsLabelGridColumnCustom3 = "" Then gsLabelGridColumnCustom3 = "Custom"


'Get the list of most recently used files to the menu
For i = 1 To frmMain.mnuFileMRU.UBound
   frmMain.mnuFileMRU(i).Tag = GetINISetting(gsAppIniFileSpec, "Recent Files", CStr(i), "")
   If frmMain.mnuFileMRU(i).Tag <> "" Then
      frmMain.mnuFileMRU(i).Visible = True
      'strip the filespec away from the tag and put into the caption for display purposes
      r = GetFileNameFromSpec(frmMain.mnuFileMRU(i).Tag, sFileSpec)        'hold the name of the file
      frmMain.mnuFileMRU(i).Caption = sFileSpec
      frmMain.mnuFileBar6.Visible = True
   End If
Next i

'Get last values for the Fax control that was last set by user
sSection = "User Selections"
With FAX_DATA
   .sSenderName = GetINISetting(gsFaxFileSpec, sSection, "Sender Name", "")
   .sSenderCompany = GetINISetting(gsFaxFileSpec, sSection, "Sender Company", "")
   .sSenderVoiceNumber = GetINISetting(gsFaxFileSpec, sSection, "Sender Voice Number", "")
   .sSenderFaxNumber = GetINISetting(gsFaxFileSpec, sSection, "Sender Fax Number", "")
   .sFaxID = GetINISetting(gsFaxFileSpec, sSection, "Fax ID", "")
   .sDialPrefix = GetINISetting(gsFaxFileSpec, sSection, "Dial Prefix", "")
   .lRetries = CInt(GetINISetting(gsFaxFileSpec, sSection, "Retries", "0"))
   .lRetryInterval = CInt(GetINISetting(gsFaxFileSpec, sSection, "Retry Interval", "1"))
   .bFaxResolution = GetINISetting(gsFaxFileSpec, sSection, "Resolution", "0")
End With


'Get the Drug types from file and place in global list
'  sSection = "Transplant Centers"
'  TxCenters(0) = GetINISetting(gsAppIniFileSpec, sSection, "Count", "0")
'  For i = 1 To TxCenters(0)
'     TxCenters(i) = GetINISetting(gsAppIniFileSpec, sSection, CStr(i), "0")
'  Next i


'Get the Drug types from file and place in global list
sSection = "Drugs"
gsDrugNames(0) = GetINISetting(gsAppIniFileSpec, sSection, "Count", "0")
For i = 1 To gsDrugNames(0)
   gsDrugNames(i) = GetINISetting(gsAppIniFileSpec, sSection, CStr(i), "0")
Next i

'Get the Drug types from file and place in global list
sSection = "Organs"
gsOrganNames(0) = GetINISetting(gsAppIniFileSpec, sSection, "Count", "0")
For i = 1 To gsOrganNames(0)
   gsOrganNames(i) = GetINISetting(gsAppIniFileSpec, sSection, CStr(i), "0")
Next i

giCurrentTip = CInt(GetINISetting(gsAppIniFileSpec, "Options", "Current Tip", 1))

'Get settings of calendar form
CAL_DEFAULTS.chkDosesMissed = CByte(GetINISetting(gsAppIniFileSpec, "Calendar Settings", "chkDosesMissed", 1))
CAL_DEFAULTS.chkDosesNotComplied = CByte(GetINISetting(gsAppIniFileSpec, "Calendar Settings", "chkDosesNotComplied", 1))
```

```
    CAL_DEFAULTS.chkDosesTaken = CByte(GetINISetting(gsApplniFileSpec, "Calendar Settings", "chkDosesTaken", 0))
    CAL_DEFAULTS.chkDoseChanged = CByte(GetINISetting(gsApplniFileSpec, "Calendar Settings", "chkDoseChanged", 1))

    'Get Settings of Patient summary form
    PAT_SUM_DEFAULTS.cmboDataToView = CByte(GetINISetting(gsApplniFileSpec, "Patient Summary Settings", "cmboDataToView", 1
    ))
    PAT_SUM_DEFAULTS.cmboChartType = CByte(GetINISetting(gsApplniFileSpec, "Patient Summary Settings", "cmboChartType", 1))


    'Get the web address for the browser
    gsWebStartingAddress = "http://"
    gsWebStartingAddress = gsWebStartingAddress + GetINISetting(gsApplniFileSpec, "Web Data", "User Name", "") + ":"
    gsWebStartingAddress = gsWebStartingAddress + GetINISetting(gsApplniFileSpec, "Web Data", "Access", "") + "@"
    gsWebStartingAddress = gsWebStartingAddress + GetINISetting(gsApplniFileSpec, "Web Data", "URL", "")

End Sub
```

Sub Main()

```
    Dim l As Long, r As Integer, i As Integer, sMSG As String, sTemp As String, dTime As Double
    Dim bBrowserFound As Boolean, lLastAccessDate As Long, lNextReminderDate As Long

    'Initialize some application settings
    gsApplniFileSpec = App.Path + "\" + "CycloTech.ini"
    gsFaxFileSpec = App.Path + "\Fax.ini"
    gsTempBuf = Space$(1024)
    gbCommOK = 99           'set to some value other than true or false to properly initialize the dialog

    frmSplash.Show
    frmSplash.Refresh
    dTime = Now             'get the time value of now

    Wait 0.75
    frmLogin.Show vbModal
    If Not frmLogin.OK Then End      'Login Failed so exit app
    Unload frmLogin
    DoEvents


    'rgh note that the debug flag is turned on and the fax icon is hidden
    ' l = Shell(App.Path + "\Faxman32.exe /D /H", 1)   'start the fax server
    l = Shell("Faxman32.exe /H", 1)   'start the fax server
    Load frmMain
    Set gcFax = frmMain.FaxMan1

    'If browser feature is turned on in the ini file, then activate item on the menu.
    'See if we should allow access to visit Sangstat on the Internet
    r = CBool(GetINISetting(gsApplniFileSpec, "Web Data", "Active", "False"))
    If r = False Then frmMain.mnuAccessWebSite.Visible = False      'no key found in ini file


    Comm_InitializeCommPort    'initialize the comm port from INI file settings
    GetProgramPreferences
    EraseDataInMemory PAT_DATA
    EraseDataInMemory TEMP_DATA

    'Set some menu items
    frmMain.mnuFileSave.Enabled = False
    frmSplash.ZOrder

    Do
        If CDbl(Now) > dTime + 0.00005 Then Exit Do      'wait for a minimum amount of time before unloading splash screen
        DoEvents
    Loop
```

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```
Unload frmSplash

frmMain.Show
SetPrinterIcon False, ""

'See if we should shown tips at startup
r = CBool(GetINISetting(gsAppIniFileSpec, "Options", "Show Tips at Startup", True))
If r Then frmTip.Show

'See if we should remind user to visit Sangstat on the Internet
If frmMain.mnuAccessWebSite.Visible = True Then      'user must have menu selection on to access web
  'Try to find a browser by looking in different locations in the registry
  frmMain.MhIni1.Key = ClassesRoot
  frmMain.MhIni1.EntrySection = "HTTP\shell\open\Command"
  frmMain.MhIni1.EntryItem = ""                    'gets the default value
  frmMain.MhIni1.Action = 13                       'get registry key
  If Len(Trim(frmMain.MhIni1.EntryValue)) > 0 Then
    bBrowserFound = True        'Looks like a value is there
  End If

  frmMain.MhIni1.Key = LocalMachine
  frmMain.MhIni1.EntrySection = "\SOFTWARE\Classes\HTTP\shell\open\command"
  frmMain.MhIni1.EntryItem = ""                    'gets the default value
  frmMain.MhIni1.Action = 13                       'get registry key
  If Len(Trim(frmMain.MhIni1.EntryValue)) > 0 Then
    bBrowserFound = True        'Looks like a value is there
  End If


  If bBrowserFound Then
    lLastAccessDate = 0
    sTemp = GetINISetting(gsAppIniFileSpec, "Web Data", "Last Web Visit Date", "")
    If IsDate(sTemp) Then lLastAccessDate = DateValue(sTemp)

    lNextReminderDate = 0
    sTemp = GetINISetting(gsAppIniFileSpec, "Web Data", "Next Web Visit Reminder Date", "")
    If IsDate(sTemp) Then lNextReminderDate = DateValue(sTemp)

    'On this line, if L is negative then it indicates that the user chose to not connect
    'the last time he/she was reminded. In this case we wait a much
    'shorter period of time before reminding them again.
    If DateValue(Now) >= lNextReminderDate Then       'it's been too long since the user was last on the web.
      If lLastAccessDate > 0 Then
        sMSG = "You last connected to our internet web site on " + sTemp + ". "
      Else
        sMSG = "You have not yet connected to our internet web site. "
      End If

      sMSG = sMSG + "There may be a program update or other valuable information there."
      sMSG = sMSG + vbCrLf + vbCrLf + "Would you like to connect to the web site now? (you must already have web access available
      )"
      Beep
      r = MsgBox(sMSG, vbQuestion + vbYesNo + vbDefaultButton2, "Internet Connection Reminder")
      'regardless of the answer to the next question, set a minimum time to ask user again.
      'If user actually connects to internet, then this time is overwritten with a longer one by the browser.
      SaveINISetting gsAppIniFileSpec, "Web Data", "Next Web Visit Reminder Date", Format$(Now + 15, "Medium Date")

      If r = vbYes Then
        Call LogonToWebSite
      End If
    End If
  End If
End If

End Sub
```

```
Public Sub LogonToWebSite()
  'Visit Sangstat on the Internet
  'Dim frmB As New frmBrowser
  'Load frmBrowser
  frmBrowser.StartingAddress = gsWebStartingAddress
  DoEvents    'allow time to paint
  DoEvents    'allow time to paint
  frmBrowser.Refresh
  frmBrowser.Show
End Sub
```

```
Public Function OpenPatientData(ByVal sFileSpec As String) As Integer
  'Open patient data file and load to memory
  'Return a true if load was successful, false if not, and vbCancel if user cancelled

  Dim r As Integer, sTemp As String, lErrorCode As Long
  On Error GoTo OpenPatientData_Error

  r = ValidatePatientDataSaved    'make sure any device data has first been saved
  If r = vbCancel Then Exit Function

  'Get a filename from the common dialog
  'Setup the common dialog control prior to showing it
  With frmMain.dlgCommonDialog
    .Flags = cdlOFNOverwritePrompt Or cdlOFNPathMustExist Or cdlOFNExplorer Or cdlOFNExtensionDifferent Or
    cdlOFNNoReadOnlyReturn Or cdlOFNHideReadOnly Or cdlOFNFileMustExist
    .CancelError = True          'generate error if CANCEL button is pressed
    .InitDir = App.Path + "\Patient Data"
    .Filter = "CycloTech Data File          *.cpd|*.cpd"
    .DialogTitle = "Open Patient Data File"
    .DefaultExt = "CPD"       'append "Structure" extention when saving.
    If sFileSpec <> "" Then .filename = sFileSpec
    .ShowOpen              'Open dialog
  End With

  'Now get the data from file
  frmMain.MousePointer = vbHourglass
  DoEvents

  r = GetPatientDataFromDisk(frmMain.dlgCommonDialog.filename, PAT_DATA, lErrorCode)
  If r <> True Then
    If lErrorCode = ERR_DATA_CHECKSUM Then
      sTemp = "The contents of the data file have changed since it was last saved. "
      sTemp = sTemp + "This could be due to a corrupt file, but is more likely that the file was manually changed."
      sTemp = sTemp + vbCrLf + vbCrLf + "The file will not be loaded."
      Beep
      MsgBox sTemp, vbCritical, "File Contents Changed"
    Else
      MsgBox "An error occurred while retrieving data from the file.  It was not read.", vbExclamation, "Error In File - " + Error(r)
    End If
  End If


  PAT_DATA.sPatientDataFileName = frmMain.dlgCommonDialog.filename
  OpenPatientData = True
  r = GetFileNameFromSpec(PAT_DATA.sPatientDataFileName, sTemp)        'hold the name of the file
  'UpDateRecentFileMenu sFileSpec
  UpDateRecentFileMenu sTemp
  frmMain.mnuFileSave.Enabled = True

OpenPatientData_Exit:
  On Error GoTo 0
  RefreshAllOpenForms
  frmMain.MousePointer = vbDefault
  Exit Function
```

```
OpenPatientData_Error:
  If Err = cdlCancel Then                    'cancel button was pressed in dialog
    OpenPatientData = vbCancel
    Resume OpenPatientData_Exit
  Else
    Beep
    MsgBox "The CycloTech Data file contains invalid data and can not be read.", vbExclamation, "Invalid Data File - " + Error
    PAT_DATA.sPatientDataFileName = ""
    frmMain.mnuFileSave.Enabled = False
  End If
  OpenPatientData = False
  Resume OpenPatientData_Exit      'exit anyway for now

End Function
```

```
Public Sub PopulateDeviceDiagDialog(DataStruct As DeviceDataStruct, SourceForm As Form)
  'There are two possible dialogs that have the same controls on them.
  'This common procedure will populate both
  Dim I As Integer

  With SourceForm
    'Show custom labels from config file if there were any
    .Label1(3) = gsCustomLblPatientLastName
    .Label1(1) = gsCustomLblPatientFirstName
    .Label1(5) = gsCustomLblPatientID
    .Label1(6) = gsCustomLblTxCenter
    .Label1(7) = gsCustomLblDrug
    .Label1(0) = gsCustomLblOrgan


    If TypeOf .txtDrug Is SSPanel Then
      .txtDrug = DataStruct.sDrug

    ElseIf TypeOf .txtDrug Is ComboBox Then     'it is a list box
      .txtDrug.Clear
      For I = 1 To gsDrugNames(0)          'fill the drugs list box with available choices
        .txtDrug.AddItem gsDrugNames(I)
      Next I

      For I = 0 To .txtDrug.ListCount - 1
        If .txtDrug.List(I) = DataStruct.sDrug Then
          .txtDrug.ListIndex = I
          Exit For
        End If
      Next I
    End If


    If TypeOf .txtOrgan Is SSPanel Then
      .txtOrgan = DataStruct.sOrgan

    ElseIf TypeOf .txtOrgan Is ComboBox Then     'it is a list box
      .txtOrgan.Clear
      For I = 1 To gsOrganNames(0)          'fill the drugs list box with available choices
        .txtOrgan.AddItem gsOrganNames(I)
      Next I

      For I = 0 To .txtOrgan.ListCount - 1
        If .txtOrgan.List(I) = DataStruct.sOrgan Then
          .txtOrgan.ListIndex = I
          Exit For
        End If
      Next I

    End If

    .txtPatientLastName = DataStruct.sPatientLastName
```

General.bas - PopulateDeviceDiagDialog

```
    .txtPatientFirstName = DataStruct.sPatientFirstName
    .txtPatientID = DataStruct.sPatientID
    .txtTxCenter = DataStruct.sTxCenter
    .txtSerialNumber = DataStruct.sSerialNumber
    .txtDoseSize = DataStruct.sDoseSize

    .txtPatientLastName.SetFocus

    If DataStruct.iEventData(0) Then
      .txtEventCount = " " + CStr(DataStruct.iEventData(0)) + " "
    Else
      .txtEventCount = ""
    End If

    For i = 1 To giMaxDoseTimes
      If DataStruct.dPrescribedDoseTime(i) >= 0 Then .txtDoseTime(i) = Format$(DataStruct.dPrescribedDoseTime(i),
       gsTimeDisplayFormat)
    Next i

    .txtDosesPerDay = CStr(DataStruct.iDosesPerDay)
    .txtDoseResolution = DataStruct.sDoseResolution
    .txtDoseLockoutHours = DataStruct.sDoseLockoutHours
    If DataStruct.lDeviceInitDate Then
      .txtDeviceStarted = " " + Format$(CDate(DataStruct.lDeviceInitDate), "Medium Date")
    End If

    .txtMedicationRemaining = " " + DataStruct.sMedRemaining
    .txtBatteryChangeTimer = " " + DataStruct.sBatteryChangeTimer
    .txtFirmwareVer = " " + DataStruct.sFirmwareVer

    'set indicators for error flags
    If DataStruct.bErrorFatal Then
      .imgFatal.Picture = .imgError.Picture
    Else
      .imgFatal.Picture = .imgNoError.Picture
    End If

    If DataStruct.bErrorNonFatal Then
      .imgNonFatal.Picture = .imgError.Picture
    Else
      .imgNonFatal.Picture = .imgNoError.Picture
    End If

    If DataStruct.bErrorDoseSize Then
      .imgDoseSize.Picture = .imgError.Picture
    Else
      .imgDoseSize.Picture = .imgNoError.Picture
    End If

    If DataStruct.bErrorMedRemaining Then
      .imgMedRemaining.Picture = .imgError.Picture
    Else
      .imgMedRemaining.Picture = .imgNoError.Picture
    End If

    If DataStruct.bErrorMemoryFull Then
      .imgMemoryFull = .imgError.Picture
    Else
      .imgMemoryFull.Picture = .imgNoError.Picture
    End If

    If DataStruct.bErrorBrownOut Then
      .imgBrownOut = .imgError.Picture
    Else
      .imgBrownOut.Picture = .imgNoError.Picture
    End If

  End With
```

```
End Sub
```

Public Sub RefreshAllOpenForms()

```
Dim r As Integer

'If any of these forms are open at the time a new file is loaded,
'then refresh them.
For r = 0 To Forms.Count - 1
  Select Case Forms(r).Name
    Case "frmPatientDosingReport"
      frmPatientDosingReport.UpdatefrmPatientDosingReportHeader
      frmPatientDosingReport.UpdatePatientGridDisplay

    Case "frmDosingCalendar"
      If PAT_DATA.dEventDate(PAT_DATA.iEventData(0)) > 0 Then frmDosingCalendar.Calendar.Date = CVDate(PAT_DATA.
      dEventDate(PAT_DATA.iEventData(0)))
      UpdateCalendar

    Case "frmPrint"
      RefreshPreview

    Case "frmPatientSummary"
      frmPatientSummary.UpDatefrmPatientSummaryHeader
      frmPatientSummary.cmboDateSelection_Click
      'frmPatientSummary.UpdatePatientDosingGraph

    Case "frmDeviceInitialize"
      PopulateDeviceCommDialog PAT_DATA, frmDeviceInitialize

    Case "frmReadDeviceData"
      PopulateDeviceCommDialog PAT_DATA, frmReadDeviceData

  End Select
Next r

End Sub
```

Public Sub SetPrinterIcon(bEnable As Boolean, sTip As String)

```
On Error Resume Next
frmMain.mnuFilePrint.Enabled = bEnable
If sTip = "" Then
  frmMain.mnuFilePrint.Caption = "Print..."
Else
  frmMain.mnuFilePrint.Caption = sTip
End If
frmMain.tbToolBar.Buttons.Item(5).Enabled = bEnable
frmMain.tbToolBar.Buttons.Item(5).ToolTipText = sTip

'If the active form is not the print form, then keep the name of the
'form in the key property of the icon. This is so that the print
'form will know what kind of information to display and print.
If frmMain.ActiveForm.Name <> "frmPrint" Then gsActiveFormName = frmMain.ActiveForm.Name
On Error GoTo 0
End Sub
```

```
Public Sub UpDateRecentFileMenu(ByVal sFileSpec As String)
  'Add the newest FileName to the menulist and move the other ones down.
  On Error GoTo 0

  Dim bDuplicateFound As Boolean, i As Integer, r As Integer, sFileName As String
  r = GetFileNameFromSpec(sFileSpec, sFileName)        'hold the name of the file

  With frmMain
  For i = 1 To .mnuFileMRU.UBound - 1
    If LCase$(.mnuFileMRU(i).Caption) = LCase$(sFileName) Then        'remove any duplicates that might appear
      .mnuFileMRU(i).Caption = ""
      .mnuFileMRU(i).Tag = ""
      bDuplicateFound = True
    End If
  Next i

  For i = .mnuFileMRU.UBound - 1 To 1 Step -1
    If .mnuFileMRU(i).Caption <> "" Then      'contains a filename  ok to shift down
      .mnuFileMRU(i + 1).Caption = .mnuFileMRU(i).Caption        'holds filename only for display purposes
      .mnuFileMRU(i + 1).Tag = .mnuFileMRU(i).Tag            'holds the filespec
      .mnuFileMRU(i + 1).Visible = True
    Else
      .mnuFileMRU(i + 1).Visible = False
    End If
  Next i

  .mnuFileMRU(1).Tag = sFileSpec
  .mnuFileMRU(1).Caption = sFileName
  .mnuFileMRU(1).Visible = True
  .mnuFileBar6.Visible = True

  End With

End Sub
```

```
Public Function GetFileNameFromSpec(ByVal sFileSpec As String, sFileName As String) As Integer
  'Strip the filename and extention from the filespec (drive\path\filename)
  Dim r As Integer
  ReDim sList(50) As String
  On Error GoTo GetFileNameFromSpec_Error

  If Len(sFileSpec) > 0 Then
    r = ParseDelimString(sFileSpec, "\", sList())      'delimit all subpaths
    sFileName = LCase$(sList(r))                'file name is last item in list

    'something was returned
    If Len(sFileName) > 0 Then GetFileNameFromSpec = True        'return success to caller
  End If


GetFileNameFromSpec_Exit:
  Exit Function

GetFileNameFromSpec_Error:
'*Resume 0
  Resume GetFileNameFromSpec_Exit

End Function
```

```
Public Function ParseDelimString(ByVal sParse As String, ByVal sDelim As String, sFieldStrings() As String) A
  'Parse "sParse" passed here.  Put resulting parsed names in a list called sFieldStrings.
  'Use sDelim as the delimiter to parse string.
  'Trim any leading and trailing spaces from each field.
  'sFieldString list must pre-exist before calling here, and should be big enough to
  'hold all delimited strings.
  'The list contains fields in the order they appeared from left to right.
  'Function returns number of fields found.

  Dim i As Integer                    'loop counter
  Dim iDelim1 As Integer, iDelim2 As Integer      'marks beginning and end of a field

  If Len(sParse) = 0 Then Exit Function        'exit if no chars in string
    iDelim1 = 0                     'set first delim marker to beginning of line
  If Right$(sParse, Len(sDelim)) <> sDelim Then      'see if a delim is already at the end of the string
    sParse = sParse + sDelim              'put a delim at end of line
  End If

  'Note: an Erase method can not be used as it redims the array to only a few elements
  For i = 0 To UBound(sFieldStrings)         'clear out old data from the array
    sFieldStrings(i) = ""
  Next i

  i = 0
  Do While iDelim1 < Len(sParse)           'keep looking til all delims are found
    iDelim2 = InStr(iDelim1 + 1, sParse, sDelim)    'look for delim in string
    'get field from string, trim off spaces and put field into list
    sFieldStrings(i + 1) = Trim$(Mid$(sParse, iDelim1 + 1, iDelim2 - iDelim1 - 1))
    iDelim1 = iDelim2                 'reset first delim marker to lastest one found
    i = i + 1                    'increment field counter
  Loop                         'repeat search
  ParseDelimString = i                 'put parsed items count in element 0 of list

End Function
```

```
Public Function SaveDataToNewFile() As Integer
  'Get a filename from the common dialog
  'Setup the common dialog control prior to showing it

  On Error GoTo SaveDataToNewFile_Error
  With frmMain.dlgCommonDialog
    .Flags = cdlOFNOverwritePrompt Or cdlOFNCreatePrompt Or cdlOFNPathMustExist Or cdlOFNExplorer Or cdlOFNExtensionDifferent
      Or cdlOFNNoReadOnlyReturn Or cdlOFNHideReadOnly
    .CancelError = True           'generate error if CANCEL button is pressed
    .InitDir = App.Path + "\Patient Data"
    .Filter = "CycloTech Data File      *.cpd|*.cpd"
    .DialogTitle = "Save Patient Data As..."
    .DefaultExt = "CPD"        'append "Structure" extention when saving.
    If PAT_DATA.sPatientDataFileName = "" Then
      .filename = PAT_DATA.sPatientLastName + " " + PAT_DATA.sPatientFirstName + " " + PAT_DATA.sPatientID + ".cpd"      'set a
      default file name
    Else
      .filename = PAT_DATA.sPatientDataFileName
    End If
    .ShowSave    'save as dialog
  End With

  PAT_DATA.sPatientDataFileName = frmMain.dlgCommonDialog.filename
  SavePatientData PAT_DATA.sPatientDataFileName
  SaveDataToNewFile = True

SaveDataToNewFile_Exit:
  Exit Function

SaveDataToNewFile_Error:
    If Err = cdlCancel Then                  'cancel button was pressed in dialog
        SaveDataToNewFile = vbCancel
        Resume SaveDataToNewFile_Exit
    End If
    SaveDataToNewFile = False

End Function
```

```
Public Function SavePatientData(ByVal sFileSpec As String) As Integer
    'Save all of the patient data currently in memory to a disk file
    'Return a true if save was successful, false if not, and vbCancel if user cancelled

    Dim sTemp As String, r As Integer, i As Integer, sSection As String
    Dim lCheckSumTally As Long

    On Error GoTo SavePatientData_Error

    ' r = GetFileNameFromSpec(frmMain.dlgCommonDialog.filename, sTemp)  'save the dir was selected by user

    'We need to confirm with user that it is desired to save these file modifications under the same
    'name as the one that was just loaded.
    '   If Len(frmMain.dlgCommonDialog.filename) And frmMain.dlgCommonDialog.filename = UCase$(Proj.sStructFileName) Then
    '   MSG$ = "You are about to save changes to the same file they were loaded from!"
    '   MSG$ = MSG$ + " Are you sure you want to do this?"
    '   Beep
    '   r = MsgBox(MSG$, MB_YES_NO, "Confirm Over Write")
    '   If r = ID_NO Then Exit Function              'oops, user almost made mistake, exit sub
    '   End If


    'Now save the data to the file
    'r = GetFileNameFromSpec(sTemp, sFileSpec)        'hold the name of the file
    'sFileSpec = App.Path & "\Patient Data"

    frmMain.MousePointer = vbHourglass
    DoEvents

    sSection = "Device Data"
    SaveINISetting sFileSpec, sSection, "Date Saved To File", Now
    SaveINISetting sFileSpec, sSection, "Host Software Version", CStr(App.Major & "." & App.Minor & "." & App.Revision)
    SaveINISetting sFileSpec, sSection, "Firmware Version", PAT_DATA.sFirmwareVer
    SaveINISetting sFileSpec, sSection, "Last Download Date", CDate(PAT_DATA.dLastDownloadDate)    'short date must be used to prevent
    error when loading back
    SaveINISetting sFileSpec, sSection, "Device Init Date", CDate(PAT_DATA.lDeviceInitDate)
    SaveINISetting sFileSpec, sSection, "Events Ref Date Time", CDate(PAT_DATA.dDeviceRefDateTime)
    SaveINISetting sFileSpec, sSection, "Last Name", PAT_DATA.sPatientLastName
    SaveINISetting sFileSpec, sSection, "First Name", PAT_DATA.sPatientFirstName
    SaveINISetting sFileSpec, sSection, "Serial Number", PAT_DATA.sSerialNumber
    SaveINISetting sFileSpec, sSection, "Patient ID", PAT_DATA.sPatientID
    SaveINISetting sFileSpec, sSection, "Organ", PAT_DATA.sOrgan
    SaveINISetting sFileSpec, sSection, "Organ Reference Number", CStr(GetOrganRefNumber())
    SaveINISetting sFileSpec, sSection, "Tx Center", PAT_DATA.sTxCenter
    SaveINISetting sFileSpec, sSection, "Drug", PAT_DATA.sDrug
    SaveINISetting sFileSpec, sSection, "Drug Reference Number", CStr(GetDrugRefNumber())
    SaveINISetting sFileSpec, sSection, "Dose Size", PAT_DATA.sDoseSize
    SaveINISetting sFileSpec, sSection, "Doses Per Day", CStr(PAT_DATA.iDosesPerDay)
    SaveINISetting sFileSpec, sSection, "Dose Resolution", PAT_DATA.sDoseResolution
    SaveINISetting sFileSpec, sSection, "Medication Remaining", PAT_DATA.sMedRemaining
    SaveINISetting sFileSpec, sSection, "Battery Change Timer", PAT_DATA.sBatteryChangeTimer
    SaveINISetting sFileSpec, sSection, "Lockout Hours Between Doses", PAT_DATA.sDoseLockoutHours

    For i = 1 To 14
        SaveINISetting sFileSpec, sSection, "Patient Score Data " + CStr(i), PAT_DATA.sScoreData(i)
    Next i

    For i = 1 To giMaxDoseTimes
        If PAT_DATA.dPrescribedDoseTime(i) >= 0 Then
```

```
            SaveINISetting sFileSpec, sSection, "Prescribed Dose Time " + CStr(i), Format$(PAT_DATA.dPrescribedDoseTime(i),
            gsTimeDisplayFormat)
        Else
            SaveINISetting sFileSpec, sSection, "Prescribed Dose Time " + CStr(i), " None"
        End If
    Next I

    'This section is finished.  Go compute the checksum and save it.
    lCheckSumTally = ComputeIniSectionChecksum(sFileSpec, sSection)
    SaveINISetting sFileSpec, "General", "Device Data Validation", CStr(lCheckSumTally)


    'Before saving new event data. clear out the old strings
    sSection = "Event Data"
    r = WritePrivateProfileString(sSection, ByVal 0&, ByVal 0&, sFileSpec)
    SaveINISetting sFileSpec, sSection, "Event Count", CStr(PAT_DATA.iEventData(0))
    For I = 1 To PAT_DATA.iEventData(0)        'total number of events
        sTemp = Format$(PAT_DATA.dEventDate(i), "General Date") + ", "
        Select Case PAT_DATA.byteEventType(i)
          Case giEVENT_DOSE_TAKEN
            sTemp = sTemp + "Dose Taken, "

          Case giEVENT_DOSE_CHANGED
            sTemp = sTemp + "Dose Change, "

          Case giEVENT_USER_DEFINED
            sTemp = sTemp + "Custom Event, "
        End Select

        sTemp = sTemp + CStr(PAT_DATA.iEventData(i))
        sTemp = sTemp + " ," + PAT_DATA.sUserData1(i)
        sTemp = sTemp + " ," + PAT_DATA.sUserData2(i)
        sTemp = sTemp + " ," + PAT_DATA.sUserData3(i)
        SaveINISetting sFileSpec, sSection, CStr(i), sTemp
    Next I

    'This section is finished.  Go compute the checksum and save it.
    lCheckSumTally = ComputeIniSectionChecksum(sFileSpec, sSection)
    SaveINISetting sFileSpec, "General", "Event Data Validation", CStr(lCheckSumTally)


    sSection = "Device Error Flags"
    SaveINISetting sFileSpec, sSection, "Fatal", CStr(PAT_DATA.bErrorFatal)
    SaveINISetting sFileSpec, sSection, "Non Fatal", CStr(PAT_DATA.bErrorNonFatal)
    SaveINISetting sFileSpec, sSection, "Dose Size", CStr(PAT_DATA.bErrorDoseSize)
    SaveINISetting sFileSpec, sSection, "Med Remaining", CStr(PAT_DATA.bErrorMedRemaining)
    SaveINISetting sFileSpec, sSection, "Memory Full", CStr(PAT_DATA.bErrorMemoryFull)
    SaveINISetting sFileSpec, sSection, "Brownout", CStr(PAT_DATA.bErrorBrownOut)

    'This section is finished.  Go compute the checksum and save it.
    lCheckSumTally = ComputeIniSectionChecksum(sFileSpec, sSection)
    SaveINISetting sFileSpec, "General", "Device Error Flags Validation", CStr(lCheckSumTally)


    gbPatientDataNotSaved = False
    r = GetFileNameFromSpec(sFileSpec, PAT_DATA.sPatientDataFileName)        'hold the name of the file
    UpDateRecentFileMenu sFileSpec
    frmMain.mnuFileSave.Enabled = True
    SavePatientData = True


SavePatientData_Exit:
    On Error GoTo 0
    frmMain.MousePointer = vbDefault
    Exit Function

SavePatientData_Error:
    SavePatientData = False
```

```
  Resume SavePatientData_Exit    'exit anyway for now

End Function
```

```
Public Sub PopulateDeviceCommDialog(DataStruct As DeviceDataStruct, SourceForm As Form)
  'There are two possible dialogs that have the same controls on them.
  'This common procedure will populate both
  On Error Resume Next      'not all text boxes will appear on every form
  Dim i As Integer

  With SourceForm
    'Show custom labels from config file if there were any
    .Label1(3) = gsCustomLblPatientLastName
    .Label1(1) = gsCustomLblPatientFirstName
    .Label1(5) = gsCustomLblPatientID
    .Label1(6) = gsCustomLblTxCenter
    .Label1(7) = gsCustomLblDrug
    .Label1(0) = gsCustomLblOrgan

    If TypeOf .txtDrug Is SSPanel Then
      .txtDrug = DataStruct.sDrug
    ElseIf TypeOf .txtDrug Is ComboBox Then     'it is a list box
      .txtDrug.Clear
      For i = 1 To gsDrugNames(0)       'fill the drugs list box with available choices
        .txtDrug.AddItem gsDrugNames(i)
      Next i


      For i = 0 To .txtDrug.ListCount - 1
        If .txtDrug.List(i) = DataStruct.sDrug Then
          .txtDrug.ListIndex = i
          Exit For
        End If
      Next i

    End If


    If TypeOf .txtOrgan Is SSPanel Then
      .txtOrgan = DataStruct.sOrgan

    ElseIf TypeOf .txtOrgan Is ComboBox Then     'it is a list box
      .txtOrgan.Clear
      For i = 1 To gsOrganNames(0)       'fill the drugs list box with available choices
        .txtOrgan.AddItem gsOrganNames(i)
      Next i


      For i = 0 To .txtOrgan.ListCount - 1
        If .txtOrgan.List(i) = DataStruct.sOrgan Then
          .txtOrgan.ListIndex = i
          Exit For
        End If
      Next i

    End If


    .txtPatientLastName = DataStruct.sPatientLastName
    .txtPatientFirstName = DataStruct.sPatientFirstName
    .txtPatientID = DataStruct.sPatientID
    .txtTxCenter = DataStruct.sTxCenter
    .txtSerialNumber = DataStruct.sSerialNumber
    .txtDoseSize = " " + DataStruct.sDoseSize
```

```
        If DataStruct.lEventData(0) Then
            .txtEventCount = " " + CStr(DataStruct.lEventData(0)) + " "
        Else
            .txtEventCount = ""
        End If

        If PAT_DATA.dLastDownloadDate Then
            .txtLastRetrievalDate = " " + Format$(CDate(DataStruct.dLastDownloadDate), "Short Date") + "  " + Format$(CDate(DataStruct.
            dLastDownloadDate), "Medium Time") + " "
        Else
            .txtLastRetrievalDate = ""
        End If

        .txtPatientLastName  'take focus away from list box after it was set

        For i = 1 To giMaxDoseTimes
            If DataStruct.dPrescribedDoseTime(i) >= 0 Then
                .txtDoseTime(i) = " " + Format$(DataStruct.dPrescribedDoseTime(i), gsTimeDisplayFormat) + " "
            End If
        Next i

        .txtDosesPerDay = " " + CStr(DataStruct.lDosesPerDay) + " "
        .txtDoseResolution = " " + DataStruct.sDoseResolution + " "
        .txtDoseLockoutHours = " " + DataStruct.sDoseLockoutHours + " "
        .txtMedicationRemaining = " " + DataStruct.sMedRemaining + " "
        If DataStruct.lDeviceInitDate Then
            .txtDeviceStarted = " " + Format$(CDate(DataStruct.lDeviceInitDate), "Medium Date")
        End If
        .txtBatteryChangeTimer = " " + DataStruct.sBatteryChangeTimer + " "

        'set indicators for error flags
        With DataStruct
            If .bErrorFatal Or .bErrorNonFatal Or .bErrorDoseSize Or .bErrorMedRemaining Or .bErrorMemoryFull Or .bErrorBrownOut Then
                SourceForm.imgErrorReceived.Visible = True       'errors were found
                SourceForm.lblErrorsReceived.Visible = True
            Else
                SourceForm.imgErrorsReceived.Visible = False      'no errors exist
                SourceForm.lblErrorsReceived.Visible = False
            End If
        End With

    End With
    On Error GoTo 0

End Sub
```

```
Public Sub SaveProgramPreferences()
    Dim I As Integer, sSection As String, sFileSpec As String
    sSection = "Preferences"
    SaveINISetting gsAppIniFileSpec, sSection, "Date Display Format", gsDateDisplayFormat
    SaveINISetting gsAppIniFileSpec, sSection, "Time Display Format", gsTimeDisplayFormat
    SaveINISetting gsAppIniFileSpec, sSection, "Compliance Time Range", CStr(gsngComplianceTimeRange)

    'Save the names of the most recently used files from the menu
    For I = 1 To frmMain.mnuFileMRU.UBound
        SaveINISetting gsAppIniFileSpec, "Recent Files", CStr(I), frmMain.mnuFileMRU(I).Caption
    Next I

    SaveINISetting gsAppIniFileSpec, "Options", "Current Tip", CStr(giCurrentTip)


    'Save Settings of Calendar Form
    SaveINISetting gsAppIniFileSpec, "Calendar Settings", "chkDosesMissed", CStr(CAL_DEFAULTS.chkDosesMissed)
    SaveINISetting gsAppIniFileSpec, "Calendar Settings", "chkDosesNotComplied", CStr(CAL_DEFAULTS.chkDosesNotComplied)
    SaveINISetting gsAppIniFileSpec, "Calendar Settings", "chkDosesTaken", CStr(CAL_DEFAULTS.chkDosesTaken)
    SaveINISetting gsAppIniFileSpec, "Calendar Settings", "chkDoseChanged", CStr(CAL_DEFAULTS.chkDoseChanged)
```

General.bas - SaveProgramPreferenc

```
    'Save Settings of Patient Summary Form
    SaveINISetting gsAppIniFileSpec, "Patient Summary Settings", "cmboDataToView", CStr(PAT_SUM_DEFAULTS.cmboDataToView)
    SaveINISetting gsAppIniFileSpec, "Patient Summary Settings", "cmboChartType", CStr(PAT_SUM_DEFAULTS.cmboChartType)
End Sub
```

```
Public Function FindFirstMatchingDateInArray(DataStruct As DeviceDataStruct, ByVal lBeginDate As Long)
    'Find the earliest event date in the global structure that starts on the same day
    'as the date passed here.  Return 0 if not found or return the index to the date
    'if one is found.
    'Note that this date is not necessarily a dosing event date.  It could be any kind of event

    'Conduct a successive approximation lookup of the date in the array
    Dim I As Integer, iLowIndex As Integer, iHighIndex As Integer, iTestIndex As Integer

    iLowIndex = 1                          'start at being of array
    iHighIndex = DataStruct.iEventData(0)       'stop at end of array
    iTestIndex = (iHighIndex + iLowIndex) / 2
    For i = 1 To 7    'this number of tines is all that is necessary to find the date
        If lBeginDate < Int(DataStruct.dEventDate(iTestIndex)) Then
            iHighIndex = iTestIndex

        ElseIf lBeginDate > Int(DataStruct.dEventDate(iTestIndex)) Then
            iLowIndex = iTestIndex

        ElseIf lBeginDate = Int(DataStruct.dEventDate(iTestIndex)) Then
            iHighIndex = iTestIndex
            FindFirstMatchingDateInArray = iTestIndex
        End If
        iTestIndex = (iHighIndex + iLowIndex + 0.5) / 2
    Next I
End Function
```

```
Public Function FindClosestDateInArray(DataStruct As DeviceDataStruct, ByVal lFromDate As Long) As Long
    'Find the latest event date in the global structure that starts on the same day
    'as the date passed here.  Return 0 if not found or return the index to the date
    'if one is found.
    'If a 0 value is passed here then find the most recent date in the array.
    'Note that this date is not necessarily a dosing event date.  There is a separate
    'procedure to find that date.

    'rgh if necessary for faster speed, this procedure can be recoded to do a successive approximation

    Dim I As Integer
    If lFromDate = 0 Then lFromDate = 99999
    For i = 1 To DataStruct.iEventData(0)     'find the latest date in the array
        If lFromDate <= Int(DataStruct.dEventDate(i)) Then
            FindClosestDateInArray = i
            Exit For
        End If
    Next I
End Function
```

```
Public Sub SaveINISetting(ByVal sFileName As String, ByVal sSection As String, ByVal sKeyField As String, s
  Dim l As Long

  l = WritePrivateProfileString(sSection, sKeyField, sValue, sFileName)

End Sub
```

```
Public Function ValidateDoseNumbers(frmTarget As Form)
  'Ensure that there are at least as many dose times as there are
  'for the number of doses per day.

  Dim I As Integer, iDailyDoseCounts As Integer, iDosesPerDay As Integer
  If Len(PAT_DATA.sPatientDataFileName) = 0 And Len(PAT_DATA.sSerialNumber) = 0 Then
    ValidateDoseNumbers = True
    Exit Function
  End If

  With frmTarget
    iDosesPerDay = Val(.txtDosesPerDay)

    For I = 1 To 4
      If IsDate(.txtDoseTime(I)) Then
        iDailyDoseCounts = iDailyDoseCounts + 1
      End If
    Next I

    If iDailyDoseCounts = iDosesPerDay Then
      ValidateDoseNumbers = True

    Else
      Beep
      MsgBox "You have indicated " + CStr(iDosesPerDay) + " Doses Per Day, yet " + CStr(iDailyDoseCounts) + " Dose Times were
      entered.  They must match.", vbExclamation, "Mis-matched Dosing Values"
      .txtDosesPerDay.SetFocus
      '.UpDownDoseTime(4).SetFocus
    End If

  End With

End Function
```

```
Public Function ValidatePatientDataSaved()
  'Ensure that the patient data in memory is saved before proceeding to load new data from device
  'Return true if successful, else return vbCancel if usr cancelled

  Dim r As Integer

  ValidatePatientDataSaved = True     'this is the default condition unless set otherwise below
  If gbPatientDataNotSaved Then
    Beep
    r = MsgBox("The patient data currently in memory has not been saved.  Do you want to save it?", vbYesNoCancel + vbQuestion, "
    Patient Data Not Saved")
    If r = vbYes Then
      r = SaveDataToNewFile()
      If r = vbCancel Then ValidatePatientDataSaved = vbCancel     'cancelled from the save as dialog

    ElseIf r = vbCancel Then
      ValidatePatientDataSaved = vbCancel          'cancelled from message box

    End If

  End If
```

Comm.bas - File Declarations

```
Attribute VB_Name = "modComm"
   Option Explicit
   'Global definitions for device communication.
   'by Glen Hamilton  10/5/97

   ' for RS232 communication
   Public gbCommTimerExpired As Integer           'this flag is set when the comm timer expires
   Public giCommPort As Integer                'Communication Port #
   Public gsCommDeviceSettings As String          'speed settings (ie 2400.N.8.2)
   Public gbCommReplyPending As Boolean            'a command was just sent. and reply is pending
   Public gbCommBusy As Boolean                'a command is in progress.  Get's cleared when reply is received or times out
   Public gbCommOK As Integer                  'needs to be an integer (no boolean) keeps current status of communications.  false= no
    comm. true = comm ok. any other value for simulation
   Public giDeviceResponseWait As Integer          'millisecs to wait for next char before assuming end of received string
   Private Const ERR_COMM_BADRESPONSE = 31001
   Private Const ERR_COMM_TIMEOUT = 30998
   'Private Const ERR_COMM_STRINGLENGTH = 30997
   'Private Const ERR_COMM_BUSY = 30996
   Private Const ERR_COMM_CHECKSUM = 30995

   Public Const ERR_DATA_CHECKSUM = 99997
   Public Const ERR_NEWER_HOST_SOFTWARE = 99998     'set when device returns custom data that was saved with a newer revision
   level


   'Device communications
   Public gbKeepPollingDevice As Boolean           'when true. continuous polling of device is done

   'Define some application specific variables & constants
   Public gsAppIniFileSpec  As String

   Type DeviceDataStruct
     sPatientLastName As String      '(16 bytes) uses 1st 16 byte block of the patient/pharmacy ID & Names
     sPatientFirstName As String     '(16 bytes) uses 1st 16 byte block of the patient/pharmacy ID & Names
     sPatientID As String
     sDrug As String              '(16 bytes) uses 2nd 16 byte block of the patient/pharmacy ID & Names
     sOrgan As String              '(16 bytes) uses 3nd 16 byte block of the patient/pharmacy ID & Names
     sTxCenter As String            '(16 bytes) uses 3nd 16 byte block of the patient/pharmacy ID & Names
     sSerialNumber As String          '(10 bytes) device serial number
     sFirmwareVer As String          'Rev version and date of firmware
     sDoseSize As String            '(1 byte) stored here in mg.  The device uses "ml" (100mg = 1 ml)
                        'Device Dose size is in optical ticks (0 to 200) max dose = 5 ml.

     sPatientDataFileName As String     'file path and filename of the data in memory

    'Note: the daily prescribed dosing times below are stored in fractional days.  This is done
    'to speed display operations and reduce the amount of memory needed.  The device actually stores
    'these values as intervals relative to 1:00 in the morning.  Thus, the times are converted to
    'intervals when communicating with the device.
    dPrescribedDoseTime(4) As Double       'doses due during the day  (prescribed)  usually a max of four
    lDosesPerDay As Integer          '(1 byte) # of doses per day (1 to 4)
    sDoseResolution As String          '(1 byte) Called "Dose Conversion" in firmware.
            'Optical ticks to mg multiplier.  (IE 2 ticks = 10 mg.)
            'Optical ticks are fixed at 0.05 ml per tick.
    sMedRemaining As String            '(2 bytes) Medication "Supply volume" remaining (in optical ticks)
    sScoreData(14) As String         . 'Today's score(14 bytes for all scores) of last 14 days doses taken.  Circular buffer.
            'valid data is value from 0-4 representing number of doses taken each day.
            'Note:  The "Score pointer" points to the current day.

    'Note that the following arrays can not be larger than 1500 events or else the space limit
    'of 64K will be exceeded.  If necessary in the future to have more events than this for
    'a single file then make a separate array for the diagnostic data or temp data.
    iEventData(1400) As Integer       'the data occurring for the event data. Might be a dose size. error flags. etc.
    dEventDate(1400) As Double        'list of dose days in order of first taken to most recent
    byteEventType(1400) As Byte       'value =0 if it is a dose taken
                    'value = 1 if data event is a dose command change
                    'value = 2 if user entered entered
    sUserData1(1400) As String        'user entered data in the first column of the grid
    sUserData2(1400) As String        'user entered data in the first column of the grid
    sUserData3(1400) As String        'user entered data in the first column of the grid

    sClock As String        '(2 bytes)10 minute resolution "0000" = 1 am on first dose day.
    lDeviceInitDate As Long        'date the device started
    dDeviceRefDateTime As Double        'date and time that all events are referenced to.
    sBatteryChangeTimer As String     '(2 bytes)Battery change timer, in 10 minute increments
    sDoseLockoutHours As String      '(1 byte) Hours to lockout dosing after a dose is taken
    bErrorFatal As Boolean        'true if this flag was set in the returned flags string
    bErrorNonFatal As Boolean       'true if this flag was set in the returned flags string
    bErrorDoseSize As Boolean        'true if this flag was set in the returned flags string
    bErrorMedRemaining As Boolean      'true if this flag was set in the returned flags string
    bErrorMemoryFull As Boolean       'true if this flag was set in the returned flags string
    bErrorBrownOut As Boolean        'true if this flag was set in the returned flags string
    bErrorsExist As Boolean        '(1 byte) Bits are set if various errors have occurred and have not
            'been corrected.  A value of "0" is normal (no errors).  Errors
            'are corrected by either correcting the specific situation or
            'resetting & reloading the dosing parameters.
            'B0=1 if fatal system failure
            'B1=1 if non-fatal system failure has occurred
            'B2=1 if error has occurred in Dose Size Volume
            'B3=1 if error has occurred in Supply Volume value
            'B4=1 if compliance memory is near full
            'B5=1 if brownout (low voltage) occurred

   dLastDownloadDate As Double        'date of last data retrieval from device

End Type
Public PAT_DATA As DeviceDataStruct
Public TEMP_DATA As DeviceDataStruct

Public gsDrugNames(25) As String        'names of drugs used to populate the list boxes on dialogs
Public gsOrganNames(25) As String       'names of gsOrganNames used to populate the list boxes on dialogs

Public Const glEVENT_DOSE_TAKEN = 0
Public Const glEVENT_DOSE_CHANGED = 1
Public Const glEVENT_USER_DEFINED = 2


'These values indicate the string position (returned from the device) where each element
'begins.  This is the string that is returned when a request for "all memory" is sent.
'See above structures for more detail information about format.
Public Const DATA_BEGIN_DOSE_SIZE = 1                  '1 byte
Public Const DATA_BEGIN_DOSE_INTERVAL1 = 1 * 2 + 1        '1 byte
Public Const DATA_BEGIN_DOSE_INTERVAL2 = 2 * 2 + 1        '1 byte
Public Const DATA_BEGIN_DOSE_INTERVAL3 = 3 * 2 + 1        '1 byte
Public Const DATA_BEGIN_DOSE_INTERVAL4 = 4 * 2 + 1        '1 byte
Public Const DATA_BEGIN_DOSES_PER_DAY = 5 * 2 + 1         '1 byte
Public Const DATA_BEGIN_DOSE_CONVERSION = 6 * 2 + 1          '1 byte
Public Const DATA_BEGIN_DOSE_LOCKOUT_HOURS = 7 * 2 + 1          '1 byte
Public Const DATA_BEGIN_DOSE_SCORE_DAY_POINTER = 8 * 2 + 1      '1 byte
Public Const DATA_BEGIN_MED_REMAINING = 9 * 2 + 1        '2 bytes
Public Const DATA_BEGIN_CLOCK = 11 * 2 + 1          '2 bytes clock starts at 1am on first dosing day (10 min increments)
Public Const DATA_BEGIN_BATTERY_CHANGE_TIMER = 13 * 2 + 1      '2 bytes
Public Const DATA_BEGIN_ERROR_FLAGS = 15 * 2 + 1        '1 byte
Public Const DATA_BEGIN_PREV_DOSE_PARAMS = 16 * 2 + 1        '16 bytes of copy of prev dosing params
                '(used for error checking internal to dispenser)
Public Const DATA_BEGIN_KEY_BITS = 32 * 2 + 1          'activation of keys on device
Public Const DATA_BEGIN_LIFE_COUNT = 33 * 2 + 1          'LSB in 33, MSB in 34
Public Const DATA_BEGIN_LIFE_COMPLETION = 35 * 2 + 1        '=0 when life cycle is programmed, =1 when life test completes
  successfully
Public Const DATA_BEGIN_COMPENSATION_FACTOR = 36 * 2 + 1      'values from 64-192 (128= 1.0 factor)
Public Const DATA_BEGIN_SERIAL_NUMBER = 38 * 2 + 1        '10 bytes
Public Const DATA_BEGIN_CUSTOM1 = 48 * 2 + 1          '16 bytes of patient/pharamcy ID & names
Public Const DATA_BEGIN_CUSTOM2 = 64 * 2 + 1          '16 bytes of patient/pharamcy ID & names
Public Const DATA_BEGIN_CUSTOM3 = 80 * 2 + 1          '16 bytes of patient/pharamcy ID & names
Public Const DATA_BEGIN_CUSTOM4 = 96 * 2 + 1          '16 bytes of patient/pharamcy ID & names
Public Const DATA_BEGIN_SCORE = 112 * 2 + 1          '14 bytes
Public Const DATA_BEGIN_COMPLIANCE_CHECKSUM = 128 * 2 + 1      '2 bytes includes compliance pointer and data
                '(up to data word 1 before data pointed to by comp pointer
Public Const DATA_BEGIN_COMPLIANCE_POINTER = 130 * 2 + 1        '2 bytes  points to nect location after end of current compliance
 data
                        'base value = 132 (0x0084)
Public Const DATA_BEGIN_COMPLIANCE_DATA = 132 * 2 + 1        '~1900 bytes max.  Array of 2 byte values for dose compliance
 history.
                        'Clock time values (in 10 minutes resolution from start) when each dose
                        'was taken.  Represented by values 0-65279 (0-0xfeff).  Each dose time
                        'is changed via the "Set Mode", a value between 0xff00 and 0xffc8 is written
                        'with the LSD byte representing the dose size.  When compliance memory is
                        'cleared, the current dose size is always written as the first location in
                        'the compliance memory.
```

```
Public Sub ChangeBatteriesRequest()
  Dim r As Integer, lErrorCode As Long, sMSG As String

  sMSG = "You should continue only if you are replacing the batteries in the device."
  sMSG = sMSG + " This ensures that the battery time counter will be accurate." + vbCrLf + vbCrLf
  sMSG = sMSG + " Did you just replace the batteries or are you about to change them now?"
  r = MsgBox(sMSG, vbQuestion + vbYesNo + vbDefaultButton2, "Change Batteries")

  If r = vbNo Then Exit Sub

  gbKeepPollingDevice = False          'stop polling for now
  Wait 0.25

  On Error GoTo ChangeBatteriesRequest_Error

  r = Comm_SendResetClockAndBattery(lErrorCode)
  If lErrorCode Then
    Error lErrorCode          'error number
  Else
    sMSG = "Replace the device batteries now and retrieve data from the device again when complete."
    r = MsgBox(sMSG, vbExclamation, "Change Batteries")
  End If

ChangeBatteriesRequest_Exit:
  gbKeepPollingDevice = True          'continue polling device
  Exit Sub

ChangeBatteriesRequest_Error:
  DisplayErrorMessage lErrorCode
  Resume ChangeBatteriesRequest_Exit

End Sub
```

```
Public Function Comm_CheckComm(lErrorCode As Long) As Integer
  'Check the device communication by sending a command and waiting for a reply.
  'If no reply is received, then return a "false" flag to caller.

  'Important Note: Due to the way the firmware was designed for the device, it seems not
  'to return anything if the command is in error.  This is not good because
  'we would not know whether or not a failed reply is due to a back cable, incorrect comm port
  'or settings, etc.  Hopefully in a future version, the comm check can return some sort of
  'character to indicate that a common byte was received, but could not be interpreted correctly.


  Dim sOut As String, sChecksum As String, sIn As String

  sOut = "Pp"                    'this is the code for checking communication with device
  CreateChecksum sOut, sChecksum        'calculate a checksum
  sOut = sOut + sChecksum + "|"         'append checksum and ending string identifier

  If Not frmMain.CommDevice.PortOpen Then frmMain.CommDevice.PortOpen = True

  gbCommBusy = True               'prevent other procedures from communicating with device
  frmMain.CommDevice.InputLen = 0       'clear input buffer
```

```
    frmMain.CommDevice.Output = sOut         'send string to device
    gbCommReplyPending = True                'prevent other procedures from communicating with device
    SetCommTimer giDeviceResponseWait        'set timer to wait for response

    lErrorCode = 0                    'reset error code
    Do
      If gbCommTimerExpired Then             'timer event sets this to true
        lErrorCode = ERR_COMM_TIMEOUT        'no response, get the error code
        GoTo Comm_CheckComm_Exit             'return to calling procedure
      End If
      DoEvents
    Loop Until frmMain.CommDevice.InBufferCount > 0       'loop till a reply is received or timeout occurs

    sIn = frmMain.CommDevice.Input           'Read response from serial port
    'comm is ok
    If sIn = "$" Then Comm_CheckComm = True        'return success to caller

  Comm_CheckComm_Exit:
    If frmMain.CommDevice.PortOpen Then frmMain.CommDevice.PortOpen = False      ' Close the serial port
    gbCommReplyPending = False               'reset flag
    gbCommBusy = False                'reset flag

  End Function
```

```
Public Function Comm_GetDeviceReply(sReply As String, lErrorCode As Long) As Integer
  'A command should have been just sent to the device from another procedure and a reply is pending.
  'Get the reply into 'sReply' and return to caller.
  'Return false if no reply and set lErrorCode to reason.
  'Return ERR_COMM_TIMEOUT if no reply from the device.
  'error code = 0 if comm is already busy.
  'If reply, then return number of characters received.
  'Close comm port once a reply is received or if an error occurs.

  Dim iLastBufferCount As Integer, r As Integer

  On Error GoTo Comm_GetDeviceReply_Error
  gbCommReplyPending = True              'set busy flag
  frmMain.MousePointer = vbHourglass

  'Open comm port in case it is closed
  'prevent device unavailable error
  If frmMain.CommDevice.PortOpen = False Then frmMain.CommDevice.PortOpen = True      'open port
  sReply = ""                  'Init reply

  'Wait for first char to arrive
  SetCommTimer giDeviceResponseWait           '20 milliseconds is normally sufficient
  Do Until frmMain.CommDevice.InBufferCount > 0
    DoEvents
    'timer event sets this to true
    If gbCommTimerExpired Then Error ERR_COMM_TIMEOUT       'return message to caller. No response
  Loop

  'First char has been received
  'Wait for all data to arrive
  iLastBufferCount = -1               'Init buffer count
  Do While frmMain.CommDevice.InBufferCount > iLastBufferCount       'characters are still arriving
    iLastBufferCount = frmMain.CommDevice.InBufferCount       'remember intermediate count
    SetCommTimer giDeviceResponseWait          'this value works as low as 25 milliseconds
    Do Until gbCommTimerExpired = True          'wait for timer to expire
      DoEvents
      DoEvents
    Loop
  Loop                  'loop if characters are still coming in

  'All data has arrived or time has been too long
```

```
   r = frmMain.CommDevice.InBufferCount          'get character length
   sReply = frmMain.CommDevice.Input             'read string from buffer
   Comm_GetDeviceReply = Len(sReply)              'return buffer length to caller (- checksum)


Comm_GetDeviceReply_Exit:
   'prevent device unavailable error
   If frmMain.CommDevice.PortOpen = True Then frmMain.CommDevice.PortOpen = False      'close port if open
   frmMain.MousePointer = vbDefault
   On Error GoTo 0                   'clear error status
   gbCommReplyPending = False                 'reset pending flag
   gbCommBusy = False                  'reset busy flag
   Exit Function


Comm_GetDeviceReply_Error:
   lErrorCode = Err                  'return error code to caller
   '"Resume 0  'for testing only
   Resume Comm_GetDeviceReply_Exit
End Function
```

```
Public Function Comm_ReadFirmwareVersion(DataStruct As DeviceDataStruct, lReturnError As Long) As Integ
   Dim sOut As String, sChecksum As String, sIn As String, lErrorCode As Long, r As String

   sOut = "W"                    'this is the code for version number
   CreateChecksum sOut, sChecksum          'calculate a checksum
   sOut = sOut + sChecksum + "T"          'append checksum and ending string identifier

   If Not frmMain.CommDevice.PortOpen Then frmMain.CommDevice.PortOpen = True

   frmMain.CommDevice.InputLen = 0          'clear input buffer
   frmMain.CommDevice.Output = sOut          'send string to device
   r = Comm_GetDeviceReply(sIn, lErrorCode)

   If lErrorCode = 0 Then               'comm was received
     r = ValidateChecksum(sIn)
     If r Then
       DataStruct.sFirmwareVer = Left$(sIn, Len(sIn) - 5)    'put string in global array
       Comm_ReadFirmwareVersion = True         'return success to caller
     End If

   Else
     lReturnError = lErrorCode
"      DisplayErrorMessage lErrorCode
   End If
End Function
```

```
Public Sub DisplayCommError(SourceForm As Form)

   gbCommOK = False
   SourceForm.imgCommStatus.Picture = SourceForm.imgRedLight
   SourceForm.lblCommStatus = "No Device Found"

   'Play disconnect sound and show status visually
   'Set properties needed by MCI to open
   With SourceForm.MMControl1
     .Notify = False
     .Wait = False
     .Shareable = False
     .filename = App.Path + "\ProbDetectVoice.wav"

     'Open the MCI WaveAudio device
     .Command = "Open"
     .Command = "sound"
     .Command = "close"
   End With
End Sub

Public Sub DisplayCommOk(SourceForm As Form)
   'Play connect sound and show status visually
   'Set properties needed by MCI to open
   gbCommOK = True
   With SourceForm.MMControl1
      .Notify = False
      .Wait = False
      .Shareable = False
      .filename = App.Path + "\morsecode.wav"

      'Open the MCI WaveAudio device
      .Command = "Open"
      .Command = "sound"
      .Command = "sound"
      .Command = "close"
   End With

   SourceForm.imgCommStatus.Picture = SourceForm.imgGreenLight
   SourceForm.lblCommStatus = "Device Ready"

End Sub

Public Sub DisplayErrorMessage(lErrorCode As Long)
   Dim sMSG As String

   Select Case lErrorCode

      Case ERR_COMM_TIMEOUT
         sMSG = "No response was received from the device to the command just issued.  Remove the device from the communicator and
         re-insert it to ensure that it is seated properly."

      Case ERR_COMM_CHECKSUM
         sMSG = "Data retrieved from the device is corrupted.  This probably occurred during transmission.  Please read the device again."

      Case ERR_COMM_BADRESPONSE
         sMSG = "The device did not interpret the command properly."

      Case ERR_NEWER_HOST_SOFTWARE
         sMSG = "The device was previously programmed with a newer version of this software.  The data can not be retrieved." + vbCrLf +
         vbCrLf + "Please obtain an updated version this software."

      Case Else
         sMSG = "An error was detected while communicating with the device.  Please try again." + vbCrLf + vbCrLf + Error$(lErrorCode)
   End Select

   MsgBox sMSG, , App.ProductName + " Comm Error - " + CStr(lErrorCode)

End Sub
```

```
Public Function GetDrugRefNumber() As Integer
  'Find the index to the organ name being using in the global structure

  Dim i As Integer

  For i = 1 To UBound(gsDrugNames)
     If LCase(PAT_DATA.sDrug) = LCase(gsDrugNames(i)) Then Exit For
  Next i

  GetDrugRefNumber = i          'return ref number to caller

End Function
```

```
Public Function GetOrganRefNumber() As Integer
  'Find the index to the organ name being using in the global structure

  Dim i As Integer

  For i = 1 To UBound(gsOrganNames)
     If LCase(PAT_DATA.sOrgan) = LCase(gsOrganNames(i)) Then Exit For
  Next i

  GetOrganRefNumber = i          'return ref number to caller

End Function
```

```
Private Function InterpretDosingData(DataStruct As DeviceDataStruct, ByVal sData As String, ByVal
dCheckSumTally As Double, ByVal lCheckSum As Long, lErrorCode As Long) As Integer
  'Parse apart the dosing data that is passed here and put into global structure.
  'Each dosing event is 2 bytes in length.
  'The checksum is passed here for comparison to the string.
  'The checksum includes the pointer bytes which is why it is passed in.

  Dim sTemp As String, iLowByte As Integer, iHiByte As Integer, lCurrentDoseAmount As Long
  Dim r As Integer, iposition As Integer, iCount As Integer, lTemp As Long
  On Error GoTo InterpretDosingData_Error

  For iposition = 1 To Len(sData) Step 4     'there are 2 hex bytes to every dose event
    iCount = iCount + 1
    iLowByte = CInt("&H" + Mid$(sData, iposition, 2))        'get first of the 2 byte hex value
    dCheckSumTally = dCheckSumTally + iLowByte                  'add to checksum
    iHiByte = CInt("&H" + Mid$(sData, iposition + 2, 2))    'get second of the 2 byte hex value
    dCheckSumTally = dCheckSumTally + iHiByte                   'add to checksum
    If iHiByte = 255 Then                                      'indicates a dose change
      DataStruct.byteEventType(iCount) = giEVENT_DOSE_CHANGED
      lCurrentDoseAmount = CLng(iLowByte) / 40 * 100        'convert from ml to mg; this is a new dose size change
      DataStruct.lEventData(iCount) = lCurrentDoseAmount
      DataStruct.dEventDate(iCount) = CLng(DataStruct.dEventDate(iCount - 1))      'get date from last dose
      'This is the very first dose change
      If DataStruct.dEventDate(iCount) = 0 Then
        DataStruct.dEventDate(iCount) = 1
      End If
    Else                                    'this is a dose
      DataStruct.byteEventType(iCount) = giEVENT_DOSE_TAKEN
      DataStruct.lEventData(iCount) = lCurrentDoseAmount     'convert from ml to mg; this is a new dose size change
      lTemp = CLng(iHiByte) * 256 + iLowByte     'date and time is 10 minute intervals since first dose day
      DataStruct.dEventDate(iCount) = DateAdd("n", lTemp * 10, DataStruct.dDeviceRefDateTime)
    End If
  Next iposition
  DataStruct.lEventData(0) = iCount       'put the total number of events in the 0 element of list

  dCheckSumTally = dCheckSumTally Mod 65536
  If dCheckSumTally = lCheckSum Then
```

```
        InterpretDosingData = True      'return success to caller
    Else
        lErrorCode = ERR_COMM_CHECKSUM
    End If

InterpretDosingData_Exit:
    On Error GoTo 0
    Exit Function

InterpretDosingData_Error:
    lErrorCode = Err
    Resume InterpretDosingData_Exit:

End Function
```

Public Function ValidateChecksum(ByVal sData As String) As Integer

```
    'Look at the data string passed here and get the checksum from the
    'end of the string.
    'sDATA should be a string that was returned from the device.
    'The last char in the string is a termination char preceeced by 4 bytes of checksum.

    Dim sTemp As String, iByte As Integer, r As Integer, iposition As Integer
    Dim lCheckSum As Long, lCheckSumTally As Long
    On Error GoTo ValidateChecksum_Error

    r = Len(sData)
    For iposition = 1 To r - 5
        iByte = Asc(Mid$(sData, iposition, 1))
        'iByte = CInt("&H" + Mid$(sData, iposition, 2))
        lCheckSumTally = lCheckSumTally + iByte         'add to checksum
    Next iposition

    lCheckSumTally = lCheckSumTally Mod 65536

    sTemp = "&H" + "0" + Mid$(sData, r - 2, 2) + Mid$(sData, r - 4, 2)
    lCheckSum = CLng(sTemp)
    If lCheckSumTally = lCheckSum Then ValidateChecksum = True      'pass success flag back to caller

ValidateChecksum_Exit:
    On Error GoTo 0
    Exit Function

ValidateChecksum_Error:
    Resume ValidateChecksum_Exit

End Function
```

Private Sub InterpretErrorFlags(DataStruct As DeviceDataStruct, ByVal iFlagsByte As Integer)

```
    'Break out the bits of the flags bytes passed here.
    'Put the results into the global arrays

    'if any flags exist, then set this to true
    If iFlagsByte Then DataStruct.bErrorsExist = True

    'Parse out flags separately
    DataStruct.bErrorFatal = (iFlagsByte And 2)
    DataStruct.bErrorNonFatal = (iFlagsByte And 4)
    DataStruct.bErrorDoseSize = (iFlagsByte And 8)
    DataStruct.bErrorMedRemaining = (iFlagsByte And 16)
    DataStruct.bErrorMemoryFull = (iFlagsByte And 32)
    DataStruct.bErrorBrownOut = (iFlagsByte And 64)
    'remaining upper 3 bits not used at present

End Sub
```

Comm.bas - Comm_ReadEntireMemoryCon ts

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```
Public Function Comm_ReadEntireMemoryContents(DataStruct As DeviceDataStruct, lReturnError As Long) A
  Dim sOut As String, sChecksum As String, sIn As String, lErrorCode As Long, r As String

  On Error GoTo Comm_ReadEntireMemoryContents_Error

  EraseDataInMemory DataStruct
  sOut = "Rr"                          'this is the code for reading entire memory
  CreateChecksum sOut, sChecksum            'calculate a checksum
  sOut = sOut + sChecksum + "]"            'append checksum and ending string identifier

  If Not frmMain.CommDevice.PortOpen Then frmMain.CommDevice.PortOpen = True

  frmMain.CommDevice.InputLen = 0              'clear input buffer
  frmMain.CommDevice.Output = sOut             'send string to device
  r = Comm_GetDeviceReply(sIn, lErrorCode)
  If r Then                             'comm was received. Should be at least this many bytes
    r = ValidateChecksum(sIn)
    If r = False Then
      lReturnError = ERR_COMM_CHECKSUM
  Exit Function
    End If

    r = ParseMemoryContents(DataStruct, sIn, lErrorCode)     'parse out the string
    If lErrorCode Then
      lReturnError = lErrorCode
  Exit Function
    End If

    Comm_ReadEntireMemoryContents = True         'return success to caller
    DataStruct.dLastDownloadDate = Now
    gbPatientDataNotSaved = True            'set this flag to true

  Else
    lReturnError = lErrorCode
    Exit Function
  End If

  r = Comm_ReadFirmwareVersion(DataStruct, lErrorCode)
  If lErrorCode Then
    lReturnError = lErrorCode
  End If

Comm_ReadEntireMemoryContents_Exit:
  On Error GoTo 0
  Exit Function

Comm_ReadEntireMemoryContents_Error:
  lReturnError = Err
  Resume Comm_ReadEntireMemoryContents_Exit

End Function
```

```
Public Function Comm_SendResetClockAndBattery(lReturnError As Long)
  'Resets the device clock to an offset that represents 1:00am
  'and resers the battery timer to zero.

  Dim sData As String, sOut As String, sReply As String, sChecksum As String
  Dim r As Integer, lErrorCode As Long, iTemp As Integer

  iTemp = CInt(Format(Now, "hh"))
  If iTemp = 0 Then iTemp = 24                    'midnight
  iTemp = (iTemp - 1) * 6                        'calc number of 10-minute penod * hours
  iTemp = iTemp + CInt((Format$(Now, "nn") - 5) / 10)      'calc number of 10-min penods in this hour
  sData = CStr(Hex(iTemp))
  If Len(sData) < 2 Then sData = "0" + sData      'ensure string is always 2 bytes long

  sOut = "Kk" + sData                       'add data string to command
  CreateChecksum sOut, sChecksum                  'calculate a checksum
  sOut = sOut + sChecksum + "T"                'append checksum and ending string identifier
  Comm_SendDataToDevice (sOut)                    'send string to comm port
  r = Comm_GetDeviceReply(sReply, lErrorCode)
  If sReply = "S" Then                      'string was successfully interpreted by device
    Comm_SendResetClockAndBattery = True         'return success to caller
  ElseIf sReply = "T" Then                  'string was not interpreted properly
    lReturnError = ERR_COMM_BADRESPONSE
  Else
    lReturnError = lErrorCode
  End If

End Function
```

```
Public Function Comm_SendCustomData(DataStruct As DeviceDataStruct, ByVal sLocation As String, lReturn
  'There are 4 locations in the device, each containing a 16 byte string.
  'There first location is usually reserved for Patient ID.
  'Any string can be contained in any location.
  'Data is taken from the global structure

  Dim sData As String, sOut As String, sReply As String, sChecksum As String
  Dim r As Integer, lErrorCode As Long, sCustomData As String
  Dim I As Integer, sTemp As String

  'Determine the appropriate command for the location of the data to be stored.
  'There are 4 fields in the device containing 16 characters each.  In the original
  'device design, this was intended to contain 4 sepeate pieces of information.
  'The client has now decided that some fields are too short and others are too long.
  'Thus, the fields are combined to be one string of 64 characters.
    'Data Structure Rev level  = giLEN_REV_DATA_STRUCTURE
    'Patient name         = giLEN_PATIENT_NAME
    'ID             = giLEN_ID
    'Drug            = giLEN_DRUG
    'TX Center          = giLEN_TX_CENTER
    'Organ            = giLEN_ORGAN

  'Create a 64 byte string from the various data elements to be saved
  'This string identifies the format of custom information.  If the format
  'changes in a future version, then this ID can be used to determine which
  'version of the software saved the info to the device.
  sCustomData = gsREV_DATA_STRUCTURE

  'Save the 2 digit number that represents this drug.
  'To save space, a numerical index of the Organ name is stored in the device
  I = GetDrugRefNumber()
  sTemp = CStr(I)
  If Len(sTemp) < 2 Then sTemp = "0" + sTemp             'force code to be 2 digits
  sCustomData = sCustomData + sTemp                    'concatenate result to outbound string

  'Save the 2 digit number that represents this organ
  'To save space, a numerical index of the Organ name is stored in the device
```

Comm.bas - Comm_SendCustomData

```
    I = GetOrganRefNumber()
    sTemp = CStr(I)
    If Len(sTemp) < 2 Then sTemp = "0" + sTemp       'force code to be 2 digits
    sCustomData = sCustomData + sTemp

    sTemp = DataStruct.sPatientID
    If Len(sTemp) > giLEN_ID Then
        sTemp = Left$(sTemp, giLEN_ID)                 'name is too long, trim letters of first name
    ElseIf Len(sTemp) < giLEN_ID Then
        sTemp = sTemp + Space$(giLEN_ID - Len(sTemp))   'name is too short to fill the designated length
    End If
    sCustomData = sCustomData + sTemp                  'concatenate result to outbound string

    sTemp = DataStruct.sTxCenter
    If Len(sTemp) > giLEN_TX_CENTER Then
        sTemp = Left$(sTemp, giLEN_TX_CENTER)          'name is too long, trim letters of first name
    ElseIf Len(sTemp) < giLEN_TX_CENTER Then
        sTemp = sTemp + Space$(giLEN_TX_CENTER - Len(sTemp))   'name is too short to fill the designated length
    End If
    sCustomData = sCustomData + sTemp                  'concatenate result to outbound string

    sTemp = DataStruct.sPatientLastName + "," + DataStruct.sPatientFirstName
    If Len(sTemp) > giLEN_PATIENT_NAME Then
        sTemp = Left$(sTemp, giLEN_PATIENT_NAME)       'name is too long, trim letters of first name
    ElseIf Len(sTemp) < giLEN_PATIENT_NAME Then
        sTemp = sTemp + Space$(giLEN_PATIENT_NAME - Len(sTemp))   'name is too short to fill the designated length
    End If
    sCustomData = sCustomData + sTemp                  'concatenate result to outbound string


    'Assemble the string to be sent
    Select Case sLocation
        Case DATA_BEGIN_CUSTOM1
            sOut = "Ww"
            sData = Mid$(sCustomData, 1, 16)

        Case DATA_BEGIN_CUSTOM2
            sOut = "Xx"
            sData = Mid$(sCustomData, 17, 16)

        Case DATA_BEGIN_CUSTOM3
            sOut = "Yy"
            sData = Mid$(sCustomData, 33, 16)

        Case DATA_BEGIN_CUSTOM4
            sOut = "Zz"
            sData = Mid$(sCustomData, 49, 16)

    End Select

    'Since the device string is limited to 16 chars, ensure that only the 1st 16 chars
    'of the string are sent.
    sOut = sOut + sData                'add data string to command
    CreateChecksum sOut, sChecksum     'calculate a checksum
    sOut = sOut + sChecksum + "T"      'append checksum and ending string identifier
    Comm_SendDataToDevice (sOut)       'send string to comm port
    r = Comm_GetDeviceReply(sReply, lErrorCode)
    If sReply = "S" Then               'string was successfully interpreted by device
        Comm_SendCustomData = True     'return success to caller
    ElseIf sReply = "T" Then           'string was not interpreted properly
        lReturnError = ERR_COMM_BADRESPONSE
    Else
        lReturnError = lErrorCode
    End If

End Function
```

```
Public Function Comm_SendDosingParams(DataStruct As DeviceDataStruct, lReturnError As Long)
'Sends the dosing parameters from the global structure to the device

    'Structure: "Ddttuuvvwwxxyyzzmmss "
    'Response:  "$"
    ' "tt" is Dose Size in pump ticks. Note that pump ticks per milliliter is fixed at 40. Hex value from 0 to 0xff. (Maximum dose size is currently
    5 mls or 200 decimal)
    ' "uu", "vv", "ww", "xx" are four Dose Interval values in hours between doses. Hex values between 1 and 0x18.
    ' "yy" is Number of Doses per day. Hex value from 1 to 4.
    ' "zz" is Pump Ticks per 10 mg Conversion value. Hex value. Typical value with present medication is 4 ticks per 10 milligrams.
    ' "mm" is Lockout Hours value. Number of hours to prevent dosing after a dose is taken.
    ' "ss" are the two checksum digits (hex) equal the one's compliment value of the two's compliment sum of the command characters and
    the data:. The ASCII values are simply added together in an 8 bit sum, then one is subtracted (modulo 256).

    Dim lData As Integer, sData As String, sOut As String, sReply As String
    Dim r As Integer, lErrorCode As Long, sChecksum As String, I As Integer
    Dim iLastIntervalSet As Integer

    On Error GoTo 0

    sOut = "Dd"                      'put command in string

    'Get Dose Size in pump ticks
    lData = Val(DataStruct.sDoseSize) * 40 / 100     'get dose size from global struct & convert to pump ticks (convert from mg to ml)
    sData = CStr(Hex(lData))             'convert value to a hex string
    If Len(sData) < 2 Then sData = "0" + sData     'ensure string is always 2 bytes long
    sOut = sOut + sData

    iLastIntervalSet = 1                 '1:00 am is the ref time for the first dose

    'Get Dose intervals in hours
    For I = 1 To giMaxDoseTimes              'max doses per day
      lData = 0                     'in case of conversion error, reset temp value
      If DataStruct.dPrescribedDoseTime(I) > 0 Then      'a negative number indicates no time was set
        lData = Format$(DataStruct.dPrescribedDoseTime(I), "hh")     'convert fractional day to hours
        lData = lData - iLastIntervalSet      'this time is relative tot he last interval that was set
        'change time to midnight
        If lData < 0 Then lData = 24 - Abs(lData)
        iLastIntervalSet = Format$(DataStruct.dPrescribedDoseTime(I), "hh")     'the next interval is realative to the last one that is set
      End If
      sData = CStr(Hex(lData))           'convert value to a hex string
      If Len(sData) < 2 Then sData = "0" + sData     'ensure string is always 2 bytes long
      sOut = sOut + sData
    Next I

    'Get number of doses per day
    sData = CStr(Hex(DataStruct.lDosesPerDay))       'convert value to a hex string
    If Len(sData) < 2 Then sData = "0" + sData      'ensure string is always 2 bytes long
    sOut = sOut + sData

    'Get conversion value
    lData = 0                      'in case of error, reset temp value
    lData = CInt(DataStruct.sDoseResolution)        'get dose resolution from global struct
    sData = CStr(Hex(lData))              'convert value to a hex string
    If Len(sData) < 2 Then sData = "0" + sData      'ensure string is always 2 bytes long
    sOut = sOut + sData

    'Get Dose lockout hours
    lData = 0                      'in case of error, reset temp value
    lData = CInt(DataStruct.sDoseLockoutHours)       'get lockout hour from global struct
    sData = CStr(Hex(lData))              'convert value to a hex string
    If Len(sData) < 2 Then sData = "0" + sData      'ensure string is always 2 bytes long
    sOut = sOut + sData

    CreateChecksum sOut, sChecksum               'calculate a checksum
    sOut = sOut + sChecksum + "T"              'append checksum and ending string identifier
    Comm_SendDataToDevice (sOut)              'send string to comm port
    r = Comm_GetDeviceReply(sReply, lErrorCode)
    If sReply = "$" Then                       'string was successfully interpreted by device
      Comm_SendDosingParams = True              'return success to caller
    ElseIf sReply = "?" Then                   'string was not interpreted properly
      lReturnError = ERR_COMM_BADRESPONSE
    Else
      lReturnError = lErrorCode
    End If

End Function
```

```
Public Function Comm_SendSerialNumber(DataStruct As DeviceDataStruct, lReturnError As Long) As Integer
  'Sends the serial number from the global structure to the device

    Dim sData As String, sOut As String, sReply As String, sChecksum As String
    Dim r As Integer, lErrorCode As Long

    sData = Left$(Trim(DataStruct.sSerialNumber), 10)    'trim leading spaces and use first 16 chars
    sData = sData + Space$(10 - Len(sData))    'pad the string with spaces
    sOut = "Nn" + sData                'add data string to command
    CreateChecksum sOut, sChecksum              'calculate a checksum
    sOut = sOut + sChecksum + "!"           'append checksum and ending string identifier
    Comm_SendDataToDevice (sOut)          'send string to comm port
    r = Comm_GetDeviceReply(sReply, lErrorCode)
    If sReply = "$" Then                 'string was successfully interpreted by device
      Comm_SendSerialNumber = True           'return success to caller
    ElseIf sReply = "?" Then              'string was not interpreted properly
      lReturnError = ERR_COMM_BADRESPONSE
    Else
      lReturnError = lErrorCode
    End If

End Function
```

```
Private Sub ConvertHexStringToAscii(ByVal sData, sConverted As String)
  'String Data from the device is usually returned as Hex characters.
  'Convert the string (passed in here) to an ASCII string and return to caller.
  'Such strings are items like patient name, serial number, etc.

    Dim sTemp As String, I As Integer, lTemp As Integer
    On Error Resume Next
    sConverted = ""                  'clear out any old string
    For I = 1 To Len(sData) Step 2
      sTemp = "&H" + Mid$(sData, I, 2)         'get a 2 char hex byte from string
      sTemp = Chr$(sTemp)              'convert value to ASCII
      sConverted = sConverted + sTemp              'concatenate to existing string being built
    Next I

End Sub
```

```
Private Sub CreateChecksum(sOut As String, sChecksum As String)
    'The string "sOut" will be sent to the device by another procedure. Before it is sent,
    'this procedure calculates a checksum and returns it to the caller
    'Return the ASCII representation of the checksum value.

    Dim I As Integer, lCheckSumTally As Long, iChecksumByteLow As Integer

    For I = 1 To Len(sOut)                    'calculate checksum
      lCheckSumTally = lCheckSumTally + Asc(Mid$(sOut, i, 1))
    Next I

    iChecksumByteLow = lCheckSumTally Mod 256
    'iChecksumByteHigh = lChecksumTally \ 256   'not being using by the device
    sChecksum = Hex(iChecksumByteLow - 1)       'checksum is the "one's complement value of a two's complement checksum"
    'value must always be 2 chars
    If Len(sChecksum) < 2 Then sChecksum = "0" + sChecksum        'place a leading "0" in front of checksum

End Sub
```

```
Public Sub EstablishDeviceComm()
    'This procedure continues to try and establish communication with the Device
    'until it succeeds. When successful, control is returned to the calling procedure.
    'The purpose of this procedure is to allow the user to try cable changes, device
    'movement, etc. without having to continue pressing keys on the keyboard.

    Dim r As Integer, lErrorCode As Long

QueryDevice:
    r = Comm_CheckComm(lErrorCode)
    If r <> True Then
      DoEvents      'allow other Windows events to be processed, so we don't lock up the computer
      Wait 1        'wait an additional amount of time before trying
      GoTo QueryDevice  'try comm again
    End If

End Sub
```

```
Function Comm_InitializeCommPort() As Integer
    'Get the inital values from INI file and
    'initialize device comm port settings

    Dim lReply As Long
    Const sSection = "Communications"

    'Get the amount of time needed for a reply to be received from the device
    giDeviceResponseWait = CInt(GetINISetting(gsAppIniFileSpec, sSection, "Device Response Wait", "50"))
    If giDeviceResponseWait < 25 Then giDeviceResponseWait = 25       'set a minimum delay time
    If giDeviceResponseWait > 500 Then giDeviceResponseWait = 500     'clamp upper limit
    frmMain.CommTimer.Interval = giDeviceResponseWait                 'set up the timer


    'Get the comm port speed settings
    giCommPort = CInt(GetINISetting(gsAppIniFileSpec, sSection, "Port", "1"))
    If giCommPort = 0 Then giCommPort = 2     'set a default of comm 2 if nothing is in the file

    gsCommDeviceSettings = GetINISetting(gsAppIniFileSpec, sSection, "Settings", "2400,n,8,2")

    'prevent device unavailable error
    If frmMain.CommDevice.PortOpen = True Then frmMain.CommDevice.PortOpen = False          'close port if open

    frmMain.CommDevice.Settings = gsCommDeviceSettings
    frmMain.CommDevice.CommPort = CStr(giCommPort)
    frmMain.CommDevice.InBufferSize = 1024
    frmMain.CommDevice.InputLen = 0
    Comm_InitializeCommPort = True                    'return success to caller


Comm_InitializeCommPort_Exit:
    Exit Function

Comm_InitializeCommPort_Error:
    Comm_InitializeCommPort = Err                    'return error to caller
    On Error GoTo 0
    Resume Comm_InitializeCommPort_Exit

End Function
```

Sub Device_OnComm()

```
  'This procedure is called by the OnComm evenet of the comm control located on
  'frmMain. This is so that the code can be shared between applications.

  Dim r As Integer, sTemp As String

  r = frmMain.CommDevice.CommEvent

'  If r = MSCOMM_ER_RXOVER Then
'     'An over run error occured. Ususally happens when getting events.
'     Exit Sub
'  End If
'
'  If r = MSCOMM_EV_EOF Then       'end of file flag received.
'     Exit Sub                      'who cares. Happens during receipt of events
'  End If
'
'  If r = MSCOMM_ER_BREAK Then     'break signal received
'     Exit Sub
'  End If
'
'
'  If r = 3 Or r = 4 Or r = 5 Then 'rts. xon xoff. CD error
'     Exit Sub
'  End If
'
'
'  MsgBox "Unexpected error occured with the device.  Please try again.", , "Comm Event - " + Str$(r)
```

```
    If iTemp Then InterpretScoreData DataStruct, sTemp, CInt(iTemp)     'parse out the scores and place in global structure
  End If

  'Get Error Flags
  sTemp = Mid$(sAllData, DATA_BEGIN_ERROR_FLAGS, 2)
  If Len(sTemp) > 0 Then InterpretErrorFlags DataStruct, Val(sTemp)     'parse out the flags and save in global structure

  'Get Medication remaining in device
  sTemp = "&H0" + Mid$(sAllData, DATA_BEGIN_MED_REMAINING + 2, 2) + Mid$(sAllData, DATA_BEGIN_MED_REMAINING, 2)
  DataStruct.sMedRemaining = CStr(CSng(sTemp / 40) * 100) + " mg"     'pump ticks are fixed at 40 per milliliter (100 mg per ml)

  'Get Dose Lockout Hours
  sTemp = "&H0" + Mid$(sAllData, DATA_BEGIN_DOSE_LOCKOUT_HOURS, 2)
  DataStruct.sDoseLockoutHours = CStr(CSng(sTemp))

  'Get Doses per day
  sTemp = "&H0" + Mid$(sAllData, DATA_BEGIN_DOSES_PER_DAY, 2)
  DataStruct.iDosesPerDay = CInt(sTemp)

  'Get Dose Resolution
  sTemp = "&H0" + Mid$(sAllData, DATA_BEGIN_DOSE_CONVERSION, 2)
  DataStruct.sDoseResolution = CStr(CSng(sTemp))


  'Get Dose Intervals
  sLastIntervalTime = "1:00"

  'Get Dose Interval 1 (alarm time)
  sTemp = "&H0" + Mid$(sAllData, DATA_BEGIN_DOSE_INTERVAL1, 2)
  If Val(sTemp) Then
    sTemp = DateAdd("H", CDbl(sTemp), sLastIntervalTime)     'the first dose is relative to 1:00 am
    sLastIntervalTime = sTemp
    DataStruct.dPrescribedDoseTime(1) = TimeValue(sTemp)
  Else
    DataStruct.dPrescribedDoseTime(1) = -1     'this value indicates that no time was received
  End If

  'Get Dose Interval 2 (alarm time)
  sTemp = "&H0" + Mid$(sAllData, DATA_BEGIN_DOSE_INTERVAL2, 2)
  If Val(sTemp) Then
    sTemp = DateAdd("H", CDbl(sTemp), sLastIntervalTime)     'the first dose is relative to 1:00 am
    sLastIntervalTime = sTemp
    DataStruct.dPrescribedDoseTime(2) = TimeValue(sTemp)
  Else
    DataStruct.dPrescribedDoseTime(2) = -1     'this value indicates that no time was received
  End If

  'Get Dose Interval 3 (alarm time)
  sTemp = "&H0" + Mid$(sAllData, DATA_BEGIN_DOSE_INTERVAL3, 2)
  If Val(sTemp) Then
    sTemp = DateAdd("H", CDbl(sTemp), sLastIntervalTime)     'the first dose is relative to 1:00 am
    sLastIntervalTime = sTemp
    DataStruct.dPrescribedDoseTime(3) = TimeValue(sTemp)
  Else
    DataStruct.dPrescribedDoseTime(3) = -1     'this value indicates that no time was received
  End If

  'Get Dose Interval 4 (alarm time)
  sTemp = "&H0" + Mid$(sAllData, DATA_BEGIN_DOSE_INTERVAL4, 2)
  If Val(sTemp) Then
    sTemp = DateAdd("H", CDbl(sTemp), sLastIntervalTime)     'the first dose is relative to 1:00 am
    sLastIntervalTime = sTemp
    DataStruct.dPrescribedDoseTime(4) = TimeValue(sTemp)
  Else
    DataStruct.dPrescribedDoseTime(4) = -1     'this value indicates that no time was received
  End If

  'Get Dose Size
```

```
sTemp = "&H0" + Mid$(sAllData, DATA_BEGIN_DOSE_SIZE, 2)
If IsNumeric(sTemp) Then
   DataStruct.sDoseSize = CStr(CSng(sTemp) / 40 * 100)      'convert from mg to ml
Else
   DataStruct.sDoseSize = ""
End If


'There are 4 fields in the device containing 16 characters each.  In the original
'device design, this was intended to contain 4 seperate pieces of information.
'The client has now decided that some fields are too short and others are too long.
'Thus, the fields are combined to be one string of 64 characters.
   'Patient name   = giLEN_PATIENT_NAME
   'ID             = giLEN_ID
   'Drug           = giLEN_DRUG
   'TX Center      = giLEN_TX_CENTER
   'Organ          = giLEN_ORGAN

'Send a message to the user if the revision level is higher than the one
'this software is using to send custom data to the device.
'The user must upgrade to the current version is order to get accurate custom data.
'This code should also handle any previous versions that saved data to the device.

'Get Custom string 1
sTemp = Mid$(sAllData, DATA_BEGIN_CUSTOM1, 32)
ConvertHexStringToAscii sTemp, sConverted
sCustomData = sConverted

'Get Custom string 2
sTemp = Mid$(sAllData, DATA_BEGIN_CUSTOM2, 32)
ConvertHexStringToAscii sTemp, sConverted
sCustomData = sCustomData + sConverted

'Get Custom string 3
sTemp = Mid$(sAllData, DATA_BEGIN_CUSTOM3, 32)
ConvertHexStringToAscii sTemp, sConverted
sCustomData = sCustomData + sConverted

'Get Custom string 4
sTemp = Mid$(sAllData, DATA_BEGIN_CUSTOM4, 32)
ConvertHexStringToAscii sTemp, sConverted
sCustomData = sCustomData + sConverted


'Pull apart the 64 char string into its sub-components
'Get the custom data structure revision level that was previously saved to the device.
'Note: this is not the same as the major and minor versions of the host software.
lStartingLocation = 1
sTemp = Mid$(sAllData, lStartingLocation, giLEN_REV_DATA_STRUCTURE)
ConvertHexStringToAscii sTemp, sConverted
'The device custom data was apparently saved with a newer version of software than this one.
If Val(sConverted) > gsREV_DATA_STRUCTURE Then
   lErrorCode = ERR_NEWER_HOST_SOFTWARE
   GoTo ParseMemoryContents_Exit
End If

'Determine the real name of the Drug by the reference number received from the device
lStartingLocation = lStartingLocation + giLEN_REV_DATA_STRUCTURE
sTemp = Trim(Mid$(sCustomData, lStartingLocation, giLEN_DRUG))
r = Val(sTemp)
If r > 0 And r < UBound(gsDrugNames) Then DataStruct.sDrug = gsDrugNames(r)

'Determine the real name of the Organ by the reference number received from the device
lStartingLocation = lStartingLocation + giLEN_DRUG
sTemp = Trim(Mid$(sCustomData, lStartingLocation, giLEN_ORGAN))
r = Val(sTemp)
If r > 0 And r < UBound(gsOrganNames) Then DataStruct.sOrgan = gsOrganNames(r)

lStartingLocation = lStartingLocation + giLEN_ORGAN
```

```
    DataStruct.sPatientID = Trim(Mid$(sCustomData, lStartingLocation, giLEN_ID))

    lStartingLocation = lStartingLocation + giLEN_ID
    DataStruct.sTxCenter = Trim(Mid$(sCustomData, lStartingLocation, giLEN_TX_CENTER))

    lStartingLocation = lStartingLocation + giLEN_TX_CENTER
    r = ParseDelimString(Trim(Mid$(sCustomData, lStartingLocation, giLEN_PATIENT_NAME)), ",", sTempList())
    DataStruct.sPatientLastName = Trim$(sTempList(1))
    DataStruct.sPatientFirstName = Trim$(sTempList(2))

    'Get Serial Number
    sTemp = Mid$(sAllData, DATA_BEGIN_SERIAL_NUMBER, 20)
    ConvertHexStringToAscii sTemp, sConverted
    DataStruct.sSerialNumber = Trim(sConverted)
    ParseMemoryContents = True     'send success to caller


ParseMemoryContents_Exit:
    On Error GoTo 0
    Exit Function

ParseMemoryContents_Error:
    'force a checksum error here because any type of error is likely due to a checksum problem
    lErrorCode = ERR_COMM_CHECKSUM
    Resume ParseMemoryContents_Exit

End Function
```

```
Public Sub PollDeviceContinually(SourceForm As Form)
    'This procedure continues to try and establish communication with the Device
    'until it succeeds. When successful, control is returned to the calling procedure.
    'The purpose of this procedure is to allow the user to try cable changes, device
    'movement, etc. without having to continue pressing keys on the keyboard.

    Dim r As Integer, bProcedureInProgress As Boolean, lErrorCode As Long

    If bProcedureInProgress Then Exit Sub
    If gbCommBusy Or gbCommReplyPending Then Exit Sub
    bProcedureInProgress = True       'prevent recursive calls to this procedure


QueryDevice:
    DoEvents            'allow other Windows events to be processed, so we don't lock up the computer
    If gbCommOK = True Then     'no need to poll as often if device was working the last time we checked
        Wait 5          'wait an additional amount of time before trying
    Else
        Wait 0.05        'poll faster until a good comm is made
    End If

    If Not gbCommBusy And Not gbCommReplyPending Then        'poll only if port not busy
        If gbKeepPollingDevice = False Then Exit Sub
        SourceForm.imgPolling.Visible = True
        SourceForm.imgPolling.Refresh
        r = Comm_CheckComm(lErrorCode)
        If gbKeepPollingDevice = False Then Exit Sub
        If r = True Then                'comm is working
            'display status has not yet been updated
            If Not gbCommOK Then DisplayCommOk SourceForm

        Else                    'comm is NOT working
            'display status has not yet been updated
            If gbCommOK Then DisplayCommError SourceForm

        End If
    End If

    Wait 0.05  'allow polling icon to be viewed
    If gbKeepPollingDevice = False Then Exit Sub
    SourceForm.imgPolling.Visible = False

    If r = ERR_COMM_TIMEOUT Then    'send an additional error message that no reply was received
        MsgBox "No response was received to a wake up command that was sent to the DosPro device. ", , "Communication Error"
    End If

    'flag has not been reset yet
    If gbKeepPollingDevice Then GoTo QueryDevice    'try comm again

    bProcedureInProgress = False        'allow future calls to this prcedure now that we are finished

End Sub
```

```
Public Sub Comm_SendDataToDevice(ByVal sOut As String)
    Dim dGoAheadTime As Double
    'A data string should have been assembled by another procedure and is now
    'ready to sent to the device.

    'If another command is in progress then wait till it is done
    'If the flags have not been reset after this delay, then exit loop anyway
    'This prevents lockups inside this loop in case there is a problem elsewhere
    dGoAheadTime = DateAdd("s", 5, CDbl(Now))
    Do While gbCommBusy Or gbCommReplyPending
        DoEvents
        DoEvents
        DoEvents
        If CDbl(Now) > dGoAheadTime Then Exit Do
    Loop

    gbCommBusy = True                   'set busy flag  (gets reset if timeout or reply not received)
    'If comm port is not open then open it
    If Not frmMain.CommDevice.PortOpen Then frmMain.CommDevice.PortOpen = True
    frmMain.CommDevice.InputLen = 0         'clear input buffer
    frmMain.CommDevice.Output = sOut         'send string to device

End Sub
```

```
Private Sub SetCommTimer(lTime As Integer)
    'The comm timer determines whether or not a reply has come back from the device.
    'The timer fires an event if the lTime has passed without the timer being reset.
    'Reset the timer to the interval passed in. then start it.
    'Set the comm busy flag, then return to caller

    frmMain.CommTimer.Enabled = False          'disable timer while resetting it
    frmMain.CommTimer.Interval = lTime        'set interval
    gbCommTimerExpired = False               'reset timer expiration flag
    frmMain.CommTimer.Enabled = True            'start timer

End Sub
```

```
Attribute VB_Name = "modPrinting"
Option Explicit

Public gbPrintFormLoading As Integer
Public gbPrinterErrorDetected As Integer
Public giTotalPrintPages As Integer            'track the number of pages being previewed
Public gbPreventPreviewUpdates As Integer
Public giPrintedPageNumber As Integer
Public gbPageNumberSuspend As Integer              'if true, don't print page number for the active page (probably cover picture)

Public giFontOptSel As Integer
Public gsSelectPrintPages As String
Public gbPrinterErrorReceived As Integer       'tells other procs that error occurred. Proc must reset flag
Public gbPrintSpoolingInProgress As Integer      'prevent crashes during spooling

Private Sub btnPrinter_Preview_Click_Proc()
'  If gTotalPrintPages > 1 Then            'there is more than one page to print
'     frmSelectPages.Show MODAL
'     Select Case gsSelectPrintPages
'        Case "All"
  frmPrint.MousePointer = vbHourglass
  gbPrintSpoolingInProgress = True
  frmPrint.vsPrinter1.Action = paPrintAll       'print all pages
  gbPrintSpoolingInProgress = False
'
'        Case "Page"
'           frmPrint.MousePointer = vbHourglass
'           gbPrintSpoolingInProgress = True
'           frmPrint.vsPrinter1.Action = paPrintPage   'print current page only
'           gbPrintSpoolingInProgress = False
'
'        Case ""
'           'nothing to do
'           gbPrintSpoolingInProgress = False
'     End Select
'
'  Else   'printing a single page that is not a picture
'     frmPrint.MousePointer = vbHourglass
'     gbPrintSpoolingInProgress = True
'     frmPrint.vsPrinter1.Action = paPrintAll       'print all pages
'     gbPrintSpoolingInProgress = False
'
'  End If
```

```
    frmPrint.btnClose.Enabled = True            'allow button to show
    frmPrint.btnPrintNow.Enabled = True
    frmPrint.MousePointer = vbDefault
    DoEvents

End Sub
```

```
Private Sub DrawHorizontalLine(cPrinter As Control, lPenColor As Long)
    ' frmPrint.vsPrinter1.FontSize = ogBodyTextSize
    ' frmPrint.vsPrinter1 = ""
    ' Exit Sub                    'skip a line from above

    'Draw a horizontal divider on the page
    'Usually divides the header or topic from the rest of the page

    cPrinter.FontSize = 12
    cPrinter = ""                 'skip a line from above
    cPrinter.PenStyle = 0           '0=solid 2=dot
    cPrinter.PenWidth = 10           'set pen width
    cPrinter.PenColor = lPenColor     'set pen color
    cPrinter.BrushColor = lPenColor


    'Print line only across a portion of page
    cPrinter.X1 = (cPrinter.PageWidth / 2) - (cPrinter.PageWidth * 0.25)
    cPrinter.X2 = (cPrinter.PageWidth / 2) + (cPrinter.PageWidth * 0.25)

    cPrinter.Y1 = cPrinter.CurrentY
    cPrinter.Y2 = cPrinter.CurrentY + 50

    cPrinter.Draw = 2             '1=line, 2=rectangle
End Sub
```

```
Private Sub PrintAllPatientsSummary()
    Dim I As Integer, lErrorCode As Long, sTableFormat As String, sTable As String, sList As String
    Dim fFontSize As Single, lCount As Integer

    On Error Resume Next

    'Prepare progress guage
    With frmPrint
        .pnlProgress.FloodPercent = 0
        .pnlProgressContainer.Visible = True
        .pnlProgressContainer.Refresh
    End With
    InitPageProperties
    fFontSize = 10


    'Print the logo on the first page
    With frmPrint.vsPrinter1
        .X1 = 700
        .X2 = frmPrint.vsPrinter1.X1 + frmPrint.picLogo.Width
        .Y1 = 500
        .Y2 = frmPrint.vsPrinter1.Y1 + frmPrint.picLogo.Height
        .Picture = frmPrint.picLogo.Picture
    End With


    'Print Information Header
    gbPageNumberSuspend = False
    With frmPrint.vsPrinter1
```

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```
        .FontName = "Arial"
        .FontBold = True
        .TextAlign = taCenterTop        'center text used in paragraphs
        .CurrentY = 1440 * 1         'print name on this line
        .FontSize = fFontSize * 1.6       'set font size
        .FontItalic = True
        frmPrint.vsPrinter1 = "All Patient's Summary"        'print name
        .FontSize = fFontSize * 1.2    'set font size
        .FontItalic = False
        DrawHorizontalLine frmPrint.vsPrinter1, &H40000        'Draw a color line
        frmPrint.vsPrinter1 = ""                    'skip a line
        frmPrint.vsPrinter1 = frmAllPatients.cmboDataToView.Text + " with " + frmAllPatients.Label1(0).Caption
        frmPrint.vsPrinter1 = "Date Range:   " + frmAllPatients.cmboDateSelection.Text + "  from " + frmAllPatients.txtStartDate.Value + " to "
↳       + frmAllPatients.txtEndDate.Value

        frmPrint.vsPrinter1 = ""                    'skip a line
        .TextAlign = taCenterTop
        .FontBold = False
        .TableBorder = tbNone
        .FontSize = fFontSize * 1.1         'set font size
        .Table = sTable                    'send out table

        frmPrint.vsPrinter1 = ""          'skip a line
        frmPrint.vsPrinter1 = ""          'skip a line
        .LineSpacing = 90                 ' % of current font
        .TextAlign = taCenterTop           'center text
    End With

    'Print the report Data
    sTableFormat = "<2400|<1800|>1700|>1700|>1000;"
    'Get the column titles from grid
    With frmAllPatients.grid
        .Row = 0
        .Col = 0
        sList = .Text
        .Col = 1
        sList = sList + "|" + .Text
        .Col = 2
        sList = sList + "|" + .Text
        .Col = 3
        sList = sList + "|" + .Text
        .Col = 4
        sList = sList + "|" + .Text
    End With
    sTable = sTableFormat + sList

    With frmPrint.vsPrinter1
        .TableBorder = tbBottom
        .FontSize = 10
        .FontBold = True
        .Table = sTable              'send out header
        frmPrint.vsPrinter1 = ""
    End With


    'Print the information from the grid control
    With frmAllPatients.grid
        lCount = .Rows - 1
        sList = ""
        For i = 1 To lCount          'number of patients in grid
            .Row = i
            .Col = 0
            sList = sList + .Text
            .Col = 1
            sList = sList + "|" + .Text
            .Col = 2
            sList = sList + "|" + .Text
            .Col = 3
            sList = sList + "|" + .Text
            .Col = 4
            sList = sList + "|" + .Text + ";"

            frmPrint.pnlProgress.FloodPercent = (i / lCount) * 100
            frmPrint.pnlProgressContainer.Refresh
        Next i
    End With

    sTable = sTableFormat + sList
    With frmPrint.vsPrinter1
        .FontSize = fFontSize * 0.9   'set font size
        .LineSpacing = 80             '% of current font
        .TextAlign = taCenterTop
        .TableBorder = tbNone
        .Table = sTable               'send out table
    End With

    On Error GoTo 0
    frmPrint.pnlProgressContainer.Visible = False      'turn off progress indicator
    frmPrint.pnlProgressContainer.Refresh

End Sub
```

```
Private Sub PrintPatientDosingReport()

    Dim I As Integer, lErrorCode As Long, sTableFormat As String, sTable As String, sList As String
    Dim fFontSize As Single, lCount As Integer, bItemChecked As Boolean

    On Error Resume Next

    'Print Cover Art to the Print preview control if needed and available
    '  If frmPrint.lbPictures.ListIndex > 0 Then    'a cover is chosen
    '   If FileExists("covers\" + sgCurrentCoverName, lErrorCode) Then   'look for a bitmap on disk
    '       'Print preview the Picture
    '       gbPageNumberSuspend = True
    '       LoadPictureToPrinterControl True      'get cover
    '       InitPageProperties
    '       frmPrint.vsPrinter1.Action = 4        'start a new page
    '       gbPageNumberSuspend = False
    '   End If
    ' End If

    'Prepare progress guage
    With frmPrint
        .pnlProgress.FloodPercent = 0
        .pnlProgressContainer.Visible = True
        .pnlProgressContainer.Refresh
    End With
    InitPageProperties
    fFontSize = 10


    'Print the logo on the first page
    With frmPrint.vsPrinter1
        .X1 = 700
        .X2 = frmPrint.vsPrinter1.X1 + frmPrint.picLogo.Width
        .Y1 = 500
        .Y2 = frmPrint.vsPrinter1.Y1 + frmPrint.picLogo.Height
        .Picture = frmPrint.picLogo.Picture
    End With


    'Print Information Header
    gbPageNumberSuspend = False
    With frmPrint.vsPrinter1
        .FontName = "Arial"
        .FontSize = fFontSize * 1.6    'set font size
        .FontBold = True
        .FontItalic = True
        '.TextColor =
        .TextAlign = taCenterTop          'center text used in paragraphs
        .CurrentY = 1440 * 1             'print name on this line
        frmPrint.vsPrinter1 = "Patient Dosing Report"       'print name
        .FontSize = fFontSize * 1.2    'set font size
        .FontItalic = False
        frmPrint.vsPrinter1 = PAT_DATA.sPatientLastName + ", " + PAT_DATA.sPatientFirstName
       DrawHorizontalLine frmPrint.vsPrinter1, &H40000        'Draw a color line
    End With

    sTableFormat = "<1400|<2800|<1400|<2800;"
    sTable = sTableFormat + gsCustomLblPatientID + ":|" + PAT_DATA.sPatientID + "|"
    sTable = sTable + gsCustomLblTxCenter + ":|" + PAT_DATA.sTxCenter + ";"
    sTable = sTable + gsCustomLblDrug + ":|" + PAT_DATA.sDrug + "|"
    sTable = sTable + gsCustomLblOrgan + ":|" + PAT_DATA.sOrgan + ";"
    With frmPrint.vsPrinter1
      frmPrint.vsPrinter1 = ""
      .TextAlign = taCenterTop                    'skip a line
      .FontBold = True
      .TableBorder = tbNone
      .FontSize = fFontSize * 1.1        'set font size
      .Table = sTable                  'send out table

      frmPrint.vsPrinter1 = ""          'skip a line
      frmPrint.vsPrinter1 = ""          'skip a line
      .LineSpacing = 90                 '% of current font
      .TextAlign = taCenterTop            'center text

      sList = "Events Types Shown: "
      If frmPatientDosingReport.chkDoses.Value Then
        sList = sList + "Doses Taken"
        bItemChecked = True
      End If

      If frmPatientDosingReport.chkDoseChanged Then
        If bItemChecked Then sList = sList + " and "
        sList = sList + "Dose Size Changes"
        bItemChecked = True

        If frmPatientDosingReport.chkUserDefined Then
          If bItemChecked Then sList = sList + " and "
          sList = sList + "User Entries"
          bItemChecked = True
        End If

        If Not bItemChecked Then
          sList = sList + "None"
        End If
        frmPrint.vsPrinter1 = ""              'skip a line
        .TextAlign = taCenterTop
        .FontSize = fFontSize * 0.9            'set font size
        frmPrint.vsPrinter1 = sList
      End If
    End With

    'Print the report Date
    frmPrint.vsPrinter1 = ""             'skip a line
    frmPrint.vsPrinter1.TextAlign = taCenterTop
    PrintDosingEventsHeader sTableFormat
    'Print the information from the grid control
    With frmPatientDosingReport.grid
      lCount = .Rows - 1
      sList = ""
      For i = 1 To lCount       'number of patients in grid
```

```
            .Row = i
            .Col = 0
            sList = sList + .Text
            .Col = 1
            sList = sList + "|" + .Text
            .Col = 2
            sList = sList + "|" + .Text
            .Col = 3
            sList = sList + "|" + .Text
            .Col = 4
            sList = sList + "|" + .Text
            .Col = 5
            sList = sList + "|" + .Text + ";"

            frmPrint.pnlProgress.FloodPercent = (I / lCount) * 100
            frmPrint.pnlProgressContainer.Refresh
        Next i
    End With

    sTable = sTableFormat + sList
    With frmPrint.vsPrinter1
        .FontSize = fFontSize * 0.9  'set font size
        .LineSpacing = 80            ' % of current font
        .TextAlign = taCenterTop
        .Table = sTable              'send out table
    End With


    On Error GoTo 0
    frmPrint.pnlProgressContainer.Visible = False     'turn off progress indicator
    frmPrint.pnlProgressContainer.Refresh

End Sub
```

```
Sub PrintDosingEventsHeader(sTableFormat As String)
    Dim sTable As String
    Dim fPrevFont As Single, bPrevBold As Boolean, sList As String

    fPrevFont = frmPrint.vsPrinter1.FontSize

    'Print the information from the grid control
    'Pass table format back to caller
    sTableFormat = "<2100|<1600|<1000|<1700|<1700|<1700;"
    With frmPatientDosingReport.grid
        sList = ""
        .Row = 0
        .Col = 0
        sList = sList + .Text
        .Col = 1
        sList = sList + "|" + .Text
        .Col = 2
        sList = sList + "|" + .Text
        .Col = 3
        sList = sList + "|" + .Text
        .Col = 4
        sList = sList + "|" + .Text
        .Col = 5
        sList = sList + "|" + .Text + ";"
    End With


    sTable = sTableFormat + sList
    frmPrint.vsPrinter1.TableBorder = tbBottom
    frmPrint.vsPrinter1.FontSize = 10
    frmPrint.vsPrinter1.FontBold = True
    frmPrint.vsPrinter1.Table = sTable         'send out header
    frmPrint.vsPrinter1 = ""
    'Put setting back to previous ones
    frmPrint.vsPrinter1.TableBorder = tbNone
    frmPrint.vsPrinter1.FontSize = fPrevFont
    frmPrint.vsPrinter1.FontBold = bPrevBold

End Sub
```

Public Sub LoadPictureToPrinterControl(ByVal bCover)

```
    'Set the printer control to size a picture and copy
    'picture from holding area to the print preview control.
    'If the picture to be displayed is a cover,
    'then the bCover flag should be set to true by caller.
    'otherwise it is assumed to be a border.

    Dim iPaperWidth%, iPaperHeight%, iNonPrintWidth%, iNonPrintHeight%
    frmPrint.vsPrinter1.PhysicalPage = True          'set physical page to paper dimension
    iPaperWidth = frmPrint.vsPrinter1.PageWidth      'determine size of paper
    iPaperHeight = frmPrint.vsPrinter1.PageHeight
    frmPrint.vsPrinter1.PhysicalPage = False         'return printer to printable area
    iNonPrintWidth = (iPaperWidth - frmPrint.vsPrinter1.PageWidth) / 2
    iNonPrintHeight = (iPaperHeight - frmPrint.vsPrinter1.PageHeight) / 2

    If iNonPrintWidth < 350 Then iNonPrintWidth = 350        'make a minimum margin
    If iNonPrintHeight < 350 Then iNonPrintHeight = 350      'make a minimum margin

    frmPrint.vsPrinter1.X1 = iNonPrintWidth
    frmPrint.vsPrinter1.X2 = frmPrint.vsPrinter1.PageWidth - iNonPrintWidth
    frmPrint.vsPrinter1.Y1 = iNonPrintHeight
    frmPrint.vsPrinter1.Y2 = frmPrint.vsPrinter1.PageHeight - iNonPrintWidth
    ' frmPrint.vsPrinter1.Draw = 2     'picture holder only

    frmPrint.vsPrinter1.Picture = LoadPicture("graphics\" & "deco.wmf")

End Sub
```

Private Sub InitPageMargins()

```
    'Set margins
    'Margins don't seem to set properly until the next page is created.
    'That's why they can be set only once before printing begins.

    frmPrint.vsPrinter1.MarginTop = 1350        'top margin
    frmPrint.vsPrinter1.MarginBottom = 1500     'bottom margin

    frmPrint.vsPrinter1.MarginLeft = 1725       'left margin
    frmPrint.vsPrinter1.MarginRight = 1700      'right margin (from right edge)

End Sub
```

```
Private Sub InitPageProperties()
  'Reset margins for text and initialize other items
  frmPrint.vsPrinter1.LineSpacing = 100          '100% of current font
  'Set the normal attributes here
  '
  '
  frmPrint.vsPrinter1.TextAlign = 0          'set centering back to normal

End Sub
```

```
Private Sub PrintPageDate()
  'Print Date
  Dim lTextHeight As Long, lTextWidth As Long, sText$
  'print date for the above tabs only
  'Rather than using .TextAlign property, text is centered here using this method
  'to ensure page centering regardless of margins or paragraph settings
  InitPageProperties
  frmPrint.vsPrinter1.FontName = "Arial"
  frmPrint.vsPrinter1.FontSize = 8
  sText = "Printed: " + Date$ + " with " + App.Title + " software."
  frmPrint.vsPrinter1.Measure = sText          'set string to measure
  lTextHeight = frmPrint.vsPrinter1.TextHei     'get text height
  lTextWidth = frmPrint.vsPrinter1.TextWid      'get text width
  frmPrint.vsPrinter1.CurrentX = (frmPrint.vsPrinter1.PageWidth - lTextWidth) / 2

  If frmPrint.vsPrinter1.CurrentY < 13000 Then
    frmPrint.vsPrinter1.CurrentY = frmPrint.vsPrinter1.PageHeight - (frmPrint.vsPrinter1.MarginBottom + (2.5 * lTextHeight))     'set line to very
    bottom
  Else
    frmPrint.vsPrinter1.CurrentY = frmPrint.vsPrinter1.PageHeight - (frmPrint.vsPrinter1.MarginBottom + (0.1 * lTextHeight))     'set line to very
    bottom
  End If

  frmPrint.vsPrinter1 = sText

  sText = "Copyright 1998 by SangStat Medical Corporation"
  frmPrint.vsPrinter1.Measure = sText          'set string to measure
  lTextWidth = frmPrint.vsPrinter1.TextWid      'get text width
  frmPrint.vsPrinter1.CurrentX = (frmPrint.vsPrinter1.PageWidth - lTextWidth) / 2
  frmPrint.vsPrinter1 = sText

End Sub
```

```
Public Sub PrintPageNumber()
  'Print page number if check box is active on form
  giPrintedPageNumber = giPrintedPageNumber + 1          'increment page number for next time
  If gbPageNumberSuspend = False Then
    frmPrint.vsPrinter1.HdrFontSize = 8
    frmPrint.vsPrinter1.Footer = "|Dosing Report     " + PAT_DATA.sPatientLastName + ", " + PAT_DATA.sPatientFirstName + ": " +
    PAT_DATA.sPatientID + "     Page " + CStr(giPrintedPageNumber)
  Else
    frmPrint.vsPrinter1.Footer = ""     'must print a blank footer otherwise old page # will show
  End If

End Sub
```

```
Public Sub RefreshPreview()

  Static bRefreshPreviewInProgress As Integer
  'prevent recursive calls to here
  If bRefreshPreviewInProgress = True Then Exit Sub
  If gbPreventPreviewUpdates Then Exit Sub
  bRefreshPreviewInProgress = True

  frmPrint.MousePointer = vbHourglass
  frmPrint.HScroll1.Enabled = False
  frmPrint.HScroll1.Refresh
  frmPrint.HScroll1.Value = 1
  DoEvents
  On Error GoTo 0                       'reset error processing

  frmPrint.btnRefresh.Enabled = False
  frmPrint.btnRefresh.Refresh

  frmPrint.btnPrintNow.Enabled = False
  frmPrint.btnPrintNow.Refresh

  frmPrint.btnClose.Enabled = False          'disable buttons until preview build is complete
  frmPrint.btnClose.Refresh

' frmPrint.btnFormat.Enabled = False
' frmPrint.btnFormat.Refresh
  DoEvents

  glTotalPrintPages = 0                  'reset the page counter
  glPrintedPagePageNumber = 1


  frmPrint.vsPrinter1.Preview = True          'print to screen
  frmPrint.vsPrinter1.Footer = ""            'Clear the footer
' frmPrint.vsPrinter1.HdrFontName = "font name goes here"  'Controls footer also
' frmPrint.vsPrinter1.HdrFontSize = ??  'Controls footer also

  'Send information to the preview screen
  'Initialize print job
  InitPageMargins

  If gbPrinterErrorDetected Then GoTo RefreshPreview_Exit

  frmPrint.vsPrinter1.PreviewPage = 1          'show 1st page
  frmPrint.vsPrinter1.PreviewMode = 0          '0=screen compatible. 1=print compat. 2 = force monochrome
  frmPrint.vsPrinter1.PageBorder = 0          'no page border
  frmPrint.vsPrinter1.TextAlign = 0          'left align text

  '' Call LoadPictureToPrinterControl(False)
  Select Case gsActiveFormName

    Case "frmPatientSummary"

    Case "frmAllPatients"
      Call PrintAllPatientsSummary

    Case "frmPatientDosingReport"
      Call PrintPatientDosingReport

  End Select

  PrintPageDate                    'print date for last recipe

  frmPrint.vsPrinter1.Action = paEndDoc          'END DOC
  frmPrint.vsPrinter1.Visible = True
  'vb5 says object does not support this method   frmPrint.vsPrinter1.Refresh
  Call UpdatePageButtons
```

```
    frmPrint.HScroll1.Max = glTotalPrintPages

  RefreshPreview_Exit:
    frmPrint.btnClose.Enabled = True              'enable buttons
    DoEvents
    bRefreshPreviewInProgress = False              'allow future calls to this procedure

    frmPrint.btnPrintNow.Enabled = True
    frmPrint.MousePointer = vbDefault
    DoEvents

  End Sub
```

```
Public Sub SetPreviewSize()
    Dim bHeightLimit%, fTemp As Single

    frmPrint.MousePointer = vbHourglass
    ' frmprint.Refresh     'a refresh of the form causes controls inside a frame to disappear
    '    frmPrint.vsPrinter1.Visible = False
    '    frmPrint.vsViewPort1.Visible = False
    DoEvents

    If (frmPrint.vsPrinter1.PageHeight / frmPrint.vsPrinter1.PageWidth) > (frmPrint.vsViewPort1.Height / frmPrint.vsViewPort1.Width) Then
     bHeightLimit = True

    Select Case frmPrint.optZoom(0).Value
       Case True              'full page view
          If bHeightLimit = True Then     'there is a height restriction in the viewport control for this print orientation
             frmPrint.vsPrinter1.Height = frmPrint.vsViewPort1.Height * 0.99
             fTemp = frmPrint.vsPrinter1.PageWidth / frmPrint.vsPrinter1.PageHeight
             fTemp = frmPrint.vsPrinter1.Height * fTemp
             frmPrint.vsPrinter1.Width = fTemp

          Else
             frmPrint.vsPrinter1.Width = frmPrint.vsViewPort1.Width * 0.99
             fTemp = frmPrint.vsPrinter1.PageHeight / frmPrint.vsPrinter1.PageWidth
             fTemp = frmPrint.vsPrinter1.Width * fTemp
             frmPrint.vsPrinter1.Height = fTemp
          End If

          'Make viewport virtual screen large enough to show full page of print control
          frmPrint.vsViewPort1.VirtualWidth = frmPrint.vsPrinter1.Width * 1
          frmPrint.vsViewPort1.VirtualHeight = frmPrint.vsPrinter1.Height * 1
          frmPrint.vsViewPort1.BorderStyle = 1       'turn off border

       Case Else          'Magnify view
          frmPrint.vsPrinter1.Width = frmPrint.vsPrinter1.PageWidth * 1
          frmPrint.vsPrinter1.Height = frmPrint.vsPrinter1.PageHeight * 1
          frmPrint.vsViewPort1.VirtualWidth = frmPrint.vsPrinter1.Width * 1         'ensure scroll bars will be shown
          frmPrint.vsViewPort1.VirtualHeight = frmPrint.vsPrinter1.Height * 1
          frmPrint.vsViewPort1.BorderStyle = 0       'turn on border
    End Select

    frmPrint.vsPrinter1.Visible = True
    frmPrint.vsViewPort1.Visible = True
    frmPrint.vsViewPort1.Refresh
    frmPrint.MousePointer = vbDefault
    DoEvents

End Sub
```

Printing.bas - UpdatePageButtons

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```
Public Sub UpdatePageButtons()
    frmPrint.lblPageNumber.Caption = "Page " + CStr(frmPrint.HScroll1.Value) + " of " + CStr(giTotalPrintPages)
    frmPrint.lblPageNumber.Refresh
    If giTotalPrintPages < 2 Then
        frmPrint.HScroll1.Enabled = False     'no scroll bar needed for a single page
    Else
        frmPrint.HScroll1.Enabled = True
    End If
    DoEvents

End Sub
```

```
Attribute VB_Name = "modFax"
Option Explicit
  Public gcFax As Control
  Public gsFaxFileSpec As String
  Public gsEditName As String      'a temporary place to hold fax names being edited or created
  Public gsEditVoice As String
  Public gsEditFax As String

  Public gsEditGroupIndexes As String    'holds temporary indexes to all locations associated with a group
  Public gsEditGroupName As String

  Type FaxDataStructure
    sFaxID As String
    sDialPrefix As String
    iRetries As Integer
    iRetryInterval As Integer
    bFaxResolution As Byte
    sSenderName As String
    sSenderCompany As String
    sSenderFaxNumber As String
    sSenderVoiceNumber As String

    iLocTotal As Integer          'a count of the locations
    sLocPersonName(100) As String      'ugh it may be desirable in the future to make these arrays dynamic
    sLocFaxNumber(100) As String
    sLocVoiceNumber(100) As String

    iGroupsTotal As Integer
    sGroupTitle(50) As String
    sGroupNamesInTitle(50) As String       'indexes to names separated by pipe. (ie 3|6|15)

    iGroupLastSelected As Integer
  End Type
  Public FAX_DATA As FaxDataStructure
```

Public Sub GetFaxLocations()

```
  Dim i As Integer, r As Integer, sSection As String

  With FAX_DATA
    sSection = "Fax Locations"
    .iLocTotal = CInt(GetINISetting(gsFaxFileSpec, sSection, "Total Locations", "0"))
    For i = 1 To .iLocTotal
      .sLocPersonName(i) = GetINISetting(gsFaxFileSpec, sSection, "Person " + CStr(i), "")
      .sLocFaxNumber(i) = GetINISetting(gsFaxFileSpec, sSection, "Fax " + CStr(i), "")
      .sLocVoiceNumber(i) = GetINISetting(gsFaxFileSpec, sSection, "Voice " + CStr(i), "")
    Next i

    sSection = "Fax Groups"
    .iGroupsTotal = GetINISetting(gsFaxFileSpec, sSection, "Total Groups", "0")
    For i = 0 To .iGroupsTotal
      .sGroupTitle(i) = GetINISetting(gsFaxFileSpec, sSection, "Group " + CStr(i), "")
      .sGroupNamesInTitle(i) = GetINISetting(gsFaxFileSpec, sSection, "Group Locations " + CStr(i), "")
    Next i

    sSection = "User Selections"
    .iGroupLastSelected = CInt(GetINISetting(gsFaxFileSpec, sSection, "Last Group Selected", "0"))

  End With

End Sub
```

```
Public Function GetIndexToFaxGroupName(ByVal sGroup As String) As Integer
  'Find sName in the list of fax names.  If found, pass index back to caller.
  'otherwise return 0.

  Dim I As Integer
  sGroup = LCase$(sGroup)
  With FAX_DATA
    For i = 1 To .iGroupsTotal
      If LCase$(.sGroupTitle(I)) = sGroup Then
        GetIndexToFaxGroupName = i
   Exit Function
      End If
    Next I
  End With

End Function
```

```
Public Function GetIndexToFaxLocName(ByVal sName As String) As Integer
  'Find sName in the list of fax names.  If found, pass index back to caller.
  'otherwise return 0.

  Dim I As Integer
  sName = LCase$(sName)
  With FAX_DATA
    For I = 1 To .iLocTotal
      If LCase$(.sLocPersonName(I)) = sName Then
        GetIndexToFaxLocName = i
        Exit For
      End If
    Next I
  End With

End Function
```

```
Public Sub RemoveGroupFromFaxList(ByVal sGroup As String)
  'Remove the name from the list and move up all others in the list.
  Dim I As Integer, j As Integer, iIndexFound As Integer

  With FAX_DATA
    For I = 1 To .iGroupsTotal          'look through whole list for name
      If .sGroupTitle(i) = sGroup Then    'found it here
        iIndexFound = i
        Exit For
      End If
    Next I

    For I = iIndexFound To .iGroupsTotal - 1
      .sGroupTitle(i) = .sGroupTitle(I + 1)
      .sGroupNamesInTitle(i) = .sGroupNamesInTitle(I + 1)
    Next I

    .iGroupsTotal = .iGroupsTotal - 1

  End With

End Sub
```

```
Public Sub RemoveNameFromFaxList(ByVal sName As String)
  'Remove the name from the list and move up all others in the list.
  Dim i As Integer, j As Integer, iIndexFound As Integer, r As Integer
  Dim sTempList(100) As String, sNewIndexes As String, iTemp As Integer

  With FAX_DATA
    For i = 1 To .iLocTotal          'look through whole list for name
      If .sLocPersonName(i) = sName Then     'found it here
        iIndexFound = i
        Exit For
      End If
    Next i

    For i = iIndexFound To .iLocTotal - 1
      .sLocPersonName(i) = .sLocPersonName(i + 1)
      .sLocVoiceNumber(i) = .sLocVoiceNumber(i + 1)
      .sLocFaxNumber(i) = .sLocFaxNumber(i + 1)
    Next i

    .iLocTotal = .iLocTotal - 1

    'Now that the name has been removed, we must look at all of the indexes of
    'each fax group to see if an index pointer was in there.  If so, it must
    'be removed.  Additionally, all index greater than the one removed must be
    'decremented by one.
    If iIndexFound Then
      For i = 1 To .iGroupsTotal      'look at each index record in a fax group
        'Parse out all of the indexs into a list for easier processing
        r = ParseDelimString(.sGroupNamesInTitle(i), "|", sTempList())
        sNewIndexes = ""
        If r Then  'indexes where found for this record
          For j = 1 To r
            'look at each item in the list to see if it equals or great than the one removed
            iTemp = CInt(sTempList(j))
            If iTemp = iIndexFound Then      'same index must be removed from list
              'nothing to do.  Don't add it to new list of indexes

            ElseIf iTemp > iIndexFound Then     'higher indexes must be decremented by one.
              iTemp = iTemp - 1
              sNewIndexes = sNewIndexes + CStr(iTemp) + "|"

            Else      'original value is OK
              sNewIndexes = sNewIndexes + CStr(iTemp) + "|"
            End If
          Next j
        End If

        .sGroupNamesInTitle(i) = sNewIndexes       'store the new list of indexes back to array
      Next i
    End If
  End With

End Sub
```

Fax.bas - SetFaxDeviceLabel

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```
Public Sub SetFaxDeviceLabel()
   'This label on the options tab displays the status of the fax device.
   'If a fax device exisrs. then the label displays the device. otherwise
   'it shows an appropnate message.

   With frmOptions.lblFaxDevice
      If gcFax.DeviceCount > 0 Then         'at least one fax device was found
      '  For i = 0 To gcFax.DeviceCount - 1
         .Caption = gcFax.Devices(0)       'show name of the device found
         .BackColor = &HFF00&              'green background
         .ForeColor = &H0&
      '  Next i

      Else      'no fax devices were found
         .Caption = "A fax device was not found.  Please ensure the fax or modem is connected propery."
         .BackColor = &H80&                'red background
         .ForeColor = &HFFFFFF              'white
      End If
   End With

End Sub
```

```
Attribute VB_Name = "modCalendar"
   Option Explicit

   Private giCompliedDosesCreated As Integer          'number of Complied Doses to show on the calendar
   Private giNonCompliedDosesCreated As Integer          'number of non-complied Doses to show on the calendar
   Private giDoseSizeChangesCreated As Integer
   Private giZoomDosesCreated As Integer          'number of Doses to show in zoom box
   Private giDosesMissedCreated As Integer          'number of objects to show for missed days
   Private gbCalendarUpdateInProgress As Integer          'prevents recursive calls while updating calendar

   Public gsngComplianceTimeRange As Single          '# of hrs on either side of a prescribed dose in which a dose must be taken


   Type CALENDAR_SELECTIONS
      chkDosesTaken As Byte
      chkDosesNotComplied As Byte
      chkDosesMissed As Byte
      chkDoseChanged As Byte
   End Type
   Public CAL_DEFAULTS As CALENDAR_SELECTIONS


   Type SUMMARY_SELECTIONS
      cmboDataToView As Byte
      cmboChartType As Byte
   End Type
   Public PAT_SUM_DEFAULTS As SUMMARY_SELECTIONS
```

Public Function CalcDaysInMonth(ByVal iMonth As Integer, ByVal lYear As Integer)

```
   'Calculate the number of days in the month/year that is passed here
   Dim I As Integer, lTemp As Long

   I = iMonth + 1
   If I = 13 Then I = 1
   lTemp = CVDate(CStr(I) + "/01/" + CStr(lYear))
   lTemp = lTemp - 1
   CalcDaysInMonth = Day(lTemp)
End Function
```

Public Sub DrawAllDoseSizeChanges()

```
   Dim I As Integer, r As Integer, iDaysInMonth As Integer
   Dim sCalendarStartDate As String, dTime As Double
   Dim lDateDifference As Long, lCalendarStartDate  As Long
   Dim bFirstDayAlreadyPlotted As Boolean, bLastDayAlreadyPlotted As Boolean
   RemoveDoseSizeChanges          'remove all of the old doses first

   iDaysInMonth = CalcDaysInMonth(frmDosingCalendar.Calendar.Month, frmDosingCalendar.Calendar.Year)
   sCalendarStartDate = CStr(frmDosingCalendar.Calendar.Month) + "/01/" + Str$(frmDosingCalendar.Calendar.Year)
   lCalendarStartDate = DateValue(sCalendarStartDate)

   If frmDosingCalendar.chkDoseChanged.Value Then
      For I = 1 To PAT_DATA.lEventData(0)          'total number of events
         If PAT_DATA.byteEventType(I) = giEVENT_DOSE_CHANGED Then          'show only med events (not errors, etc)
            lDateDifference = Int(PAT_DATA.dEventDate(I)) - lCalendarStartDate
            If lDateDifference >= 0 And lDateDifference < iDaysInMonth Then
               dTime = PAT_DATA.dEventDate(I) - Int(PAT_DATA.dEventDate(I))
               DrawSingleDoseSizeChange CInt(lDateDifference + 1), dTime, I, True
            End If
         End If
      Next I
   End If

   'This section of code ensures that dosing info is always plotted on the first and
   'last day of the month.
   If bFirstDayAlreadyPlotted = False Then
```

```
        r = FindPrescibedDoseSizeForSpecificDay(PAT_DATA, lCalendarStartDate)
        DrawSingleDoseSizeChange 1, dTime, r, False
    End If

    If bLastDayAlreadyPlotted = False Then
        r = FindPrescibedDoseSizeForSpecificDay(PAT_DATA, lCalendarStartDate + iDaysInMonth - 1)
        DrawSingleDoseSizeChange iDaysInMonth, dTime, r, False
    End If

    For i = 1 To giDoseSizeChangesCreated              'show all the Doses
      frmDosingCalendar.shapeDoseSizeChange(i).Visible = True
    Next i

End Sub
```

```
Public Sub DrawAllCompliedDosesTaken()
  Dim i As Integer, r As Integer
  Dim sCalendarStartDate As String, dTime As Double
  Dim lDateDifference As Long, lCalendarStartDate  As Long
  Dim iDayDoseCount As Integer, iDayNumberBeingPlotted As Integer, iLastDoseDayDrawn As Integer
  Dim iDaysInMonth As Integer, lTemp As Long

  RemoveCompliedDosesTaken        'remove all of the old doses first
  If frmDosingCalendar.chkDosesTaken.Value = False Then Exit Sub

  sCalendarStartDate = CStr(frmDosingCalendar.Calendar.Month) + "/01/" + Str$(frmDosingCalendar.Calendar.Year)
  lCalendarStartDate = DateValue(sCalendarStartDate)

  'Calc the number of days in the month being displayed
  iDaysInMonth = CalcDaysInMonth(frmDosingCalendar.Calendar.Month, frmDosingCalendar.Calendar.Year)

  For i = 1 To PAT_DATA.lEventData(0)               'total number of events
    If PAT_DATA.byteEventType(i) = giEVENT_DOSE_TAKEN Then     'show only med events (not errors, etc)
      lDateDifference = Int(PAT_DATA.dEventDate(i)) - lCalendarStartDate
      If lDateDifference >= 0 And lDateDifference < iDaysInMonth Then    'dose occurred during this month
        'Determine if the dose occurred within the compliance parameters
        r = IsDoseWithinPrescribedTimeRange(PAT_DATA, i)      'pass index to event time
        If r Then
          iDayNumberBeingPlotted = CInt(lDateDifference + 1)
          If iDayNumberBeingPlotted = iLastDoseDayDrawn Then
            iDayDoseCount = iDayDoseCount + 1       'plotting same day as last dose
          Else
            iDayDoseCount = 1    'this is a new day.  Reset counter
          End If
          iLastDoseDayDrawn = iDayNumberBeingPlotted       'remember that we are plotting on this dat
          DrawSingleCompliedDoseTaken iDayNumberBeingPlotted, dTime, i, iDayDoseCount
        End If
      End If
    End If
  Next i

  For i = 1 To giCompliedDosesCreated              'show all the Doses
    frmDosingCalendar.shapeDose(i).Visible = True
  Next i

End Sub
```

```
Public Sub DrawAllDosesMissed()
    Dim i As Integer, iDaysInMonth As Integer, l As Long
    Dim sCalendarStartDate As String
    Dim lDateDifference As Long, lCalendarStartDate  As Long
    Dim iDayDoseCount As Integer, iDayBeingPlotted As Integer

    RemoveDosesMissed        'remove all of the old doses first
    If frmDosingCalendar.chkDosesMissed.Value = False Then Exit Sub

    iDaysInMonth = CalcDaysInMonth(frmDosingCalendar.Calendar.Month, frmDosingCalendar.Calendar.Year)
    sCalendarStartDate = CStr(frmDosingCalendar.Calendar.Month) + "/01/" + CStr(frmDosingCalendar.Calendar.Year)
    lCalendarStartDate = DateValue(sCalendarStartDate)

    For l = lCalendarStartDate To lCalendarStartDate + iDaysInMonth - 1        'sequence through all days in month
        If l >= PAT_DATA.dEventDate(1) Then   'day being plotted is not earlier than 1st dose in structure
            If l < PAT_DATA.dEventDate(PAT_DATA.iEventData(0)) Then   'day being plotted is not later than last dose in structure
                iDayBeingPlotted = l - lCalendarStartDate + 1             'get the current month day to plot
                iDayDoseCount = CalcDosesSumTakenOnSpecificDay(PAT_DATA, l)        'calc missed doses for this day
                For i = 1 To PAT_DATA.iDosesPerDay - iDayDoseCount
                    DrawSingleDoseMissed iDayBeingPlotted, i           'Plot the current day
                Next i
            End If
        End If
    Next l

    For i = 1 To giDosesMissedCreated                          'show all the Doses
        frmDosingCalendar.shapeDoseMissed(i).Visible = True
    Next i

End Sub
```

```
Public Sub DrawAllNonCompliedDosesTaken()
    Dim i As Integer, j As Integer, bDoseOutOfCompliance As Boolean
    Dim dTimeLimit As Double, dLowLimit As Double, dHighLimit As Double
    Dim sCalendarStartDate As String, dTime As Double
    Dim lDateDifference As Long, lCalendarStartDate  As Long
    Dim iDayDoseCount As Integer, iDayNumberBeingPlotted As Integer, iLastDoseDayDrawn As Integer
    Dim iDaysInMonth As Integer

    RemoveNonCompliedDosesTaken        'remove all of the old doses first
    If frmDosingCalendar.chkDosesNotComplied.Value = False Then Exit Sub

    iDaysInMonth = CalcDaysInMonth(frmDosingCalendar.Calendar.Month, frmDosingCalendar.Calendar.Year)
    sCalendarStartDate = CStr(frmDosingCalendar.Calendar.Month) + "/01/" + Str$(frmDosingCalendar.Calendar.Year)
    lCalendarStartDate = DateValue(sCalendarStartDate)

    dTimeLimit = gsngComplianceTimeRange / 24
    For i = 1 To PAT_DATA.iEventData(0)                'total number of events
        If PAT_DATA.byteEventType(i) = giEVENT_DOSE_TAKEN Then   'show only med events (not errors, etc)
            lDateDifference = Int(PAT_DATA.dEventDate(i)) - lCalendarStartDate
            If lDateDifference >= 0 And lDateDifference <= iDaysInMonth Then    'dose occurred during this month
                dTime = PAT_DATA.dEventDate(i) - Int(PAT_DATA.dEventDate(i))    'get time of dose
                'Determine if the dose occurred within the compliance parameters
                'Tgh see if we can use our procedure already created

                If gsngComplianceTimeRange Then        'do test if there is a value set in the compliance time range
                    bDoseOutOfCompliance = True      'set default to be out of range unless otherwise set below
                    For j = 1 To PAT_DATA.iDosesPerDay
                        'compare dose time against all of the alarm times
                        dLowLimit = PAT_DATA.dPrescribedDoseTime(j) - dTimeLimit - 0.0001        'add a factor to prevent rounding error
                        dHighLimit = PAT_DATA.dPrescribedDoseTime(j) + dTimeLimit + 0.0001
                        If dTime >= dLowLimit And dTime <= dHighLimit Then     'this dose is within compliance
                            bDoseOutOfCompliance = False             'set flag to not plot this dose
                            Exit For  'no need for further testing of this dose.  It is in compliance
                        End If
                    Next j
            Else    'there is no compliance range
              bDoseOutOfCompliance = False
            End If

            If bDoseOutOfCompliance Then
              iDayNumberBeingPlotted = CInt(lDateDifference + 1)
              If iDayNumberBeingPlotted = iLastDoseDayDrawn Then
                iDayDoseCount = iDayDoseCount + 1       'plotting same day as last dose
              Else
                iDayDoseCount = 1   'this is a new day.  Reset counter
              End If
              iLastDoseDayDrawn = iDayNumberBeingPlotted       'remember that we are plotting on this dat

              DrawSingleNonCompliedDoseTaken CInt(lDateDifference + 1), dTime, i, iDayDoseCount
            End If
          End If
        End If
      Next i

      For i = 1 To giNonCompliedDosesCreated                  'show all the Doses
        frmDosingCalendar.shapeDoseNonComply(i).Visible = True
      Next i
    End Sub
```

```
Public Sub DrawSingleDoseSizeChange(iDay As Integer, dTime As Double, iEventNumber As Integer, bHighlig
  'Draw dosing Doses for the day of the month and time of day passed in here.
  'Time of time is expressed in decimal places as a portion of a day (VB time format)
  'NOTE: No checks are currently made to determine whether the event is a med event or
  'a non-med event. If both events are kept in the same array, then a test of the med bit
  'must be done before plotting.
  'A Dose is not visible when first created. The caller should display the Doses once they
  'are all created, so as to speed the redraw of the screen.
  'Create another clone of the the Dose shape located in the array Dose(0)
  'When this feature is on, a dose size is automatically entered on the first and last day of the month.

  '   On Error Resume Next
  Dim i As Integer, lWeekDay As Integer
  Dim lDoseLeft As Single, lDoseTop As Single
  Dim lTemp As Long, lDayWidth As Long, lDayHeight As Long

  giDoseSizeChangesCreated = giDoseSizeChangesCreated + 1               'increment counter
  Load frmDosingCalendar.shapeDoseSizeChange(giDoseSizeChangesCreated)           'create a new object
  DoEvents
  frmDosingCalendar.shapeDoseSizeChange(giDoseSizeChangesCreated) = " " + CStr(PAT_DATA.lEventData(iEventNumber)) + " mg
  "
  If bHighlight Then
    frmDosingCalendar.shapeDoseSizeChange(giDoseSizeChangesCreated).BackColor = &HFFFFC0          'blue
    frmDosingCalendar.shapeDoseSizeChange(giDoseSizeChangesCreated).ToolTipText = " Dose Size Was Changed Today "
  Else
    frmDosingCalendar.shapeDoseSizeChange(giDoseSizeChangesCreated).ToolTipText = " Current Dose Size "
  End If

  '_____________
  'These lines are a work-around for a bug in the control that causes it to
  'return the wrong values for day.left, day.top, etc. When fixed, we can simply use those properties
  'and remove these calculations.
  lDayWidth = (frmDosingCalendar.Calendar.Width - 50) / 7             'actual scalewidth of a single day
  lTemp = (frmDosingCalendar.Calendar.DayLeft(iDay) * 26) / lDayWidth        'approximate location of the day
  lWeekDay = CInt(lTemp)
  lDoseLeft = (lWeekDay * lDayWidth)     'get left edge of day to plot
  'lDoseLeft = lDoseLeft + ((lDayWidth / 5) * iPlotPosition - 1) - (lDayWidth / 10)
  lDoseLeft = lDoseLeft + (lDayWidth * 0.8) - frmDosingCalendar.shapeDoseSizeChange(giDoseSizeChangesCreated).Width
  '_____________
  If Int(lDayWidth / 150) < 7 Then
    frmDosingCalendar.shapeDoseSizeChange(giDoseSizeChangesCreated).FontBold = False
  Else
```

```
        frmDosingCalendar.shapeDoseSizeChange(giDoseSizeChangesCreated).FontBold = True
    End If

    frmDosingCalendar.shapeDoseSizeChange(giDoseSizeChangesCreated).FontSize = Int(lDayWidth / 150)
    frmDosingCalendar.shapeDoseSizeChange(giDoseSizeChangesCreated).Left = lDoseLeft

    '______________
    'These lines are a work-around for a bug in the control that causes it to
    'return the wrong values for day left, day.top, etc. When fixed, we can simply use those properties
    'and remove these calculations.
    'The control is even moe stupid than I first supected. It can not always return the proper vertical
    'location of a day, thus, we have to jump through more hoops to figure out what week that a particular
    'day is in.
    lDayHeight = (frmDosingCalendar.Calendar.Height - 50) - 625        'an offset is used to compensate for height of title
    lDayHeight = lDayHeight / 6
    iWeekDay = (frmDosingCalendar.Calendar.DayLeft(1) * 26) / lDayWidth        'the approximate location of the day
    lTemp = Int((iDay + iWeekDay - 1) / 7)
    '______________
    lDoseTop = (lTemp * lDayHeight) + 625    'this number factors in the title bar
    lDoseTop = lDoseTop + 50
    frmDosingCalendar.shapeDoseSizeChange(giDoseSizeChangesCreated).Top = lDoseTop
    frmDosingCalendar.shapeDoseSizeChange(giDoseSizeChangesCreated).Tag = iEventNumber        'keep event number for updating the
    zoom box

    ' On Error GoTo 0

End Sub
```

```
Private Sub DrawSingleNonCompliedDoseTaken(iDay As Integer, dTime As Double, iEventNumber As
Integer, iPlotPosition As Integer)
    'Draw dosing Doses for the day of the month and time of day passed in here.
    'Time of time is expressed in decimal places as a portion of a day (VB time format)
    'NOTE: No checks are currently made to determine whether the event is a med event or
    'a non-med event. If both events are kept in the same array, then a test of the med bit
    'must be done before plotting.
    'A Dose is not visible when first created. The caller should display the Doses once they
    'are all created, so as to speed the redraw of the screen.
    'Create another clone of the the Dose shape located in the array Dose(0)
    On Error Resume Next
    Dim I As Integer, iWeekDay As Integer
    Dim lDoseLeft As Single, lDoseTop As Single
    Dim lTemp As Long, lDayWidth As Long, lDayHeight As Long

    giNonCompliedDosesCreated = giNonCompliedDosesCreated + 1        'increment Dose counter
    Load frmDosingCalendar.shapeDoseNonComply(giNonCompliedDosesCreated)        'create a new Dose

    '______________
    'These lines are a work-around for a bug in the control that causes it to
    'return the wrong values for day.left, day.top, etc. When fixed, we can simply use those properties
    'and remove these calculations.
    lDayWidth = (frmDosingCalendar.Calendar.Width - 50) / 7        'actual scalewidth of a single day
    iWeekDay = (frmDosingCalendar.Calendar.DayLeft(iDay) * 26) / lDayWidth        'approximate location of the day
    '______________

    lDoseLeft = (iWeekDay * lDayWidth)    'get left edge of day to plot
    lDoseLeft = lDoseLeft + ((lDayWidth / 5) * iPlotPosition - 1) - (lDayWidth / 10)
    frmDosingCalendar.shapeDoseNonComply(giNonCompliedDosesCreated).Left = lDoseLeft


    '______________
    'These lines are a work-around for a bug in the control that causes it to
    'return the wrong values for day.left, day.top, etc. When fixed, we can simply use those properties
    'and remove these calculations.
    'The control is even moe stupid than I first supected. It can not always return the proper vertical
    'location of a day, thus, we have to jump through more hoops to figure out what week that a particular
    'day is in.
    lDayHeight = (frmDosingCalendar.Calendar.Height - 50) - 625        'an offset is used to compensate for height of title
    lDayHeight = lDayHeight / 6
    iWeekDay = (frmDosingCalendar.Calendar.DayLeft(1) * 26) / lDayWidth          'the approximate location of the day
    lTemp = Int((lDay + iWeekDay - 1) / 7)
    '

    lDoseTop = (lTemp * lDayHeight) + 625     'this number factors in the title bar
    lDoseTop = lDoseTop + lDayHeight - 50 - frmDosingCalendar.shapeDose(0).Height - frmDosingCalendar.shapeDoseNonComply(0).
     Height   'draw in middle of day
    frmDosingCalendar.shapeDoseNonComply(giNonCompliedDosesCreated).Top = lDoseTop

    frmDosingCalendar.shapeDoseNonComply(giNonCompliedDosesCreated).Tag = iEventNumber          'keep event number for updating the
     zoom box.

    On Error GoTo 0
End Sub
```

```
Public Function IsDoseWithinPrescribedTimeRange(DataStruct As DeviceDataStruct, ByVal iIndex As Integer)
    'Test to see that the event at the index passed here is a medication event and that
    'it is within the prescribed time range for a daily dose.  If yes, then
    'pass TRUE back to the caller.
    Dim I As Integer, dTime As Double
    Dim dTimeLimit As Double, dLowLimit As Double, dHighLimit As Double

    dTimeLimit = gsngComplianceTimeRange / 24
    dTime = DataStruct.dEventDate(iIndex) - Int(DataStruct.dEventDate(iIndex))          'get time of dose
    If gsngComplianceTimeRange Then
       For I = 1 To DataStruct.iDosesPerDay
          'compare dose time against all of the alarm times
          dLowLimit = DataStruct.dPrescribedDoseTime(I) - dTimeLimit - 0.0001          'add a factor to prevent rounding error
          dHighLimit = DataStruct.dPrescribedDoseTime(I) + dTimeLimit + 0.0001
          If dTime >= dLowLimit And dTime <= dHighLimit Then
             IsDoseWithinPrescribedTimeRange = True
             Exit For   'no need to do any further testing for this dose
          End If
       Next I
    Else      'there is no compliance range, so pass back a success flag
       IsDoseWithinPrescribedTimeRange = True
    End If
End Function
```

```
Private Sub PrintCalendar()
'   This routine is called when the user presses the print button
'   on the calendar form
'
'   Dim sPrintInfo As String
'   Dim CRLF As String
'   Dim bcolorCalendar As Long
'   Dim bcolorpnlZoom As Long
'   Dim bcolorpnlTime As Long
'   Dim bcolorForm As Long
'   Dim fcolorPrescribed As Long
'   Dim fcolorMissed As Long
'   Dim fcolorWeek As Long
'
'   Dim curTop As Long
'   Dim curWidth As Integer
'   Dim curHeight As Integer
'
'   Const XOffset = 1920
'   Const YOffset = 1890
'
'   On Error GoTo Error_btnPrint
'
'
'   CRLF = Chr$(13) + Chr$(10)
'
```

```
    curTop = Me.Top
    curWidth = Me.Width
    curHeight = Me.Height

    ' Hide this guy off the screen while we print
    Me.Top = -(curHeight * 2)

    ' Save current background colors
    bcolorCalendar = Calendar.BackColor
    bcolorpnlZoom = pnlZoom.BackColor
    bcolorpnlTime = pnlTime.BackColor
    bcolorForm = Me.BackColor
    fcolorPrescribed = chkDosesTaken.FillColor
    fcolorMissed = chkDosesMissed.FillColor
    fcolorWeek = chkWeekNumbers.FillColor

    ' hide the buttons
    btnClose.Visible = False
    btnPrint.Visible = False

    ' Add date + time info to printed data
    sPrintInfo = "Printed on: " + Format$(Now, "ddddd hh:nn")
    lblPrintInfo.Caption = sPrintInfo

    ' Set titles at top of printed page
    lblTitle.Caption = "Dosing Calendar"
    lblPatient.Caption = "Patient: " + tgDevicestat.sPatient
    lbldrug.Caption = "Drug: " + tgDevicestat.sDrug

    ' Set background colors
    Calendar.BackColor = WHITE
    pnlZoom.BackColor = WHITE
    pnlTime.BackColor = WHITE
    Me.BackColor = WHITE
    chkDosesTaken.FillColor = WHITE
    chkDosesMissed.FillColor = WHITE
    chkWeekNumbers.FillColor = WHITE

    ' Let user know we are printing
    Load frm_Status
    frm_Status.lblStatus.Caption = "Preparing to print calendar"
    frm_Status.Show

    ' Move resize the form and move objects to give space for printing
    Call DeleteAllObjects      ' remove extraneous elements from calendar
    Call MoveFormObjects(Me, XOffset, YOffset, True)
    Call UpdateCalendar
    DoEvents

    'Call UpdateZoomBox

    ' Switch on visibility of titles
    lblPrintInfo.Visible = True
    lblTitle.Visible = True
    lblPatient.Visible = True
    lbldrug.Visible = True

    ' Make Check boxes two dimensional
    chkDosesTaken.CheckBox2d = True
    chkDosesMissed.CheckBox2d = True
    chkWeekNumbers.CheckBox2d = True


    ' Bring the Zoom lables to the front
    lblZoomTime.ZOrder 0
    lblZoomTime.Visible = True

    ' Print the form
```

```
Me.Height = Me.Height - YOffset
Me.Width = Me.Width - XOffset

DoEvents
Me.PrintForm
DoEvents


frm_Status.lblStatus.Caption = "Sending calendar to printer"

' hide the titles and show the buttons
lblPrintInfo.Visible = False
lblTitle.Visible = False
```

Calendar.bas - PrintCalendar

```
    lblPatient.Visible = False
    lbldrug.Visible = False

    ' Move everything back
    Call DeleteAllObjects
    Call MoveFormObjects(Me, -XOffset, -YOffset, True)
    Call UpdateCalendar

    ' Restore background colors
    Calendar.BackColor = bcolorCalendar
    pnlZoom.BackColor = bcolorpnlZoom
    pnlTime.BackColor = bcolorpnlTime
    Me.BackColor = bcolorForm
    chkDosesTaken.FillColor = fcolorPrescribed
    chkDosesMissed.FillColor = fcolorMissed
    chkWeekNumbers.FillColor = fcolorWeek

    ' Restore buttons
    btnClose.Visible = True
    btnPrint.Visible = True

    ' Set check boxes back to 3d
    ' Make Check boxes two dimensional
    chkDosesTaken.CheckBox2d = False
    chkDosesMissed.CheckBox2d = False
    chkWeekNumbers.CheckBox2d = False

    ' Bring box back into view
    Me.Width = curWidth
    Me.Height = curHeight
    Me.Top = curTop        ' bring form back into view

    Unload frm_Status

Exit_btnPrint:
    Exit Sub



Error_btnPrint:
    Resume Exit_btnPrint
```

```
End Sub
```

```
Public Sub RemoveDoseSizeChanges()
    Dim I As Integer
    On Error Resume Next

    For I = 1 To giDoseSizeChangesCreated           'remove all previous Doses
      Unload frmDosingCalendar.shapeDoseSizeChange(I)
    Next I
    giDoseSizeChangesCreated = 0

    On Error GoTo 0
End Sub
```

```
Public Sub RemoveDosesMissed()
    Dim I As Integer
    On Error Resume Next

    For I = 1 To giDosesMissedCreated               'remove all previous objects
      Unload frmDosingCalendar.shapeDoseMissed(I)
    Next I
    giDosesMissedCreated = 0

    On Error GoTo 0
End Sub
```

```
Public Sub RemoveCompliedDosesTaken()
    Dim I As Integer
    On Error Resume Next

    For I = 1 To giCompliedDosesCreated             'remove all previous Doses
      Unload frmDosingCalendar.shapeDose(I)
    Next I
    giCompliedDosesCreated = 0
    On Error GoTo 0
End Sub
```

```
Public Sub RemoveNonCompliedDosesTaken()
    Dim I As Integer
    On Error Resume Next

    For I = 1 To giNonCompliedDosesCreated          'remove all previous Doses
      Unload frmDosingCalendar.shapeDoseNonComply(I)
    Next I
    giNonCompliedDosesCreated = 0

    On Error GoTo 0
End Sub
```

```
Public Sub UpdateZoomBox()
  'A different day was clicked on the calendar, so we need to plot the events for
  'the current day into the zoom box.
  'This procedure draws doses taken for a given day
  'NOTE:  No checks are currently made to determine whether the event is a med event or
  'a non-med event.  If both events are kept in the same array, then a test of the med bit
  'must be done before plotting.

  Dim i As Integer, dTime As Double, iDoseDay As Integer, iZoomPanelWidth As Integer
  Static bProcedureInProgress
  If bProcedureInProgress Then Exit Sub
  bProcedureInProgress = True

  On Error Resume Next                        'prevent error if already unloaded
  For i = 1 To giZoomDosesCreated                 'remove all previous Doses
    Unload frmDosingCalendar.shapeZoomDose(i)
  Next I
  giZoomDosesCreated = 0


  For I = 1 To 4
    Unload frmDosingCalendar.shapeZoomPrescribed(i)          'clear the text box for zoom time
    Unload frmDosingCalendar.shapeZoomTimeRange(I)            'clear the text box for zoom time
  Next I

  On Error GoTo 0                          'resume normal error status

  IZoomPanelWidth = frmDosingCalendar.pnlZoom.Width        'speed up process by defining width from control
  For I = 1 To 4
    If PAT_DATA.dPrescribedDoseTime(I) >= 0 Then
      dTime = PAT_DATA.dPrescribedDoseTime(i) - Int(PAT_DATA.dPrescribedDoseTime(I))
      Load frmDosingCalendar.shapeZoomTimeRange(I)
      frmDosingCalendar.shapeZoomTimeRange(i).Left = (IZoomPanelWidth * dTime) - (IZoomPanelWidth * (
       gsngComplianceTimeRange / 24))
      frmDosingCalendar.shapeZoomTimeRange(I).Width = (IZoomPanelWidth * (gsngComplianceTimeRange / 24) * 2)
     'frmDosingCalendar.shapeZoomTimeRange(I).ToolTipText = " Compliance Time Range = +- " + CStr(gsngComplianceTimeRange
       ) + " Hrs."
      frmDosingCalendar.shapeZoomTimeRange(I).Visible = True
      frmDosingCalendar.shapeZoomTimeRange(I).ZOrder
    End If
  Next I

  For I = 1 To 4
    If PAT_DATA.dPrescribedDoseTime(I) >= 0 Then
      dTime = PAT_DATA.dPrescribedDoseTime(I) - Int(PAT_DATA.dPrescribedDoseTime(I))
      Load frmDosingCalendar.shapeZoomPrescribed(I)
      frmDosingCalendar.shapeZoomPrescribed(I).Left = (IZoomPanelWidth * dTime) - (frmDosingCalendar.shapeZoomPrescribed(I).
       Width / 2) + 15
      frmDosingCalendar.shapeZoomPrescribed(I).ToolTipText = Format$(dTime, gsTimeDisplayFormat)
      frmDosingCalendar.shapeZoomPrescribed(I).Visible = True
      frmDosingCalendar.shapeZoomPrescribed(I).ZOrder
    End If
  Next I


' For i = 1 To 4
'   frmDosingCalendar.txtZoomTime(i).Caption = ""        'clear the text box for zoom time
' Next i

  Dim ICalendarDate As Long
  ICalendarDate = DateValue(frmDosingCalendar.Calendar.Date)
  For I = 1 To giCompliedDosesCreated
    'rgh we may later want to use a global array instead of the tag property to prevent flashing and speed things up.
    IDoseDay = frmDosingCalendar.shapeDose(I).Tag              'get the day that the dose was taken on
    If Int(PAT_DATA.dEventDate(IDoseDay)) = ICalendarDate Then
      'Create another clone of the the Dose shape located in the array Dose(0)
      giZoomDosesCreated = giZoomDosesCreated + 1                  'increment Dose counter
```

```
            Load frmDosingCalendar.shapeZoomDose(giZoomDosesCreated)          'create a new Dose
            dTime = PAT_DATA.dEventDate(lDoseDay) - Int(PAT_DATA.dEventDate(lDoseDay))
            frmDosingCalendar.shapeZoomDose(giZoomDosesCreated).Left = (frmDosingCalendar.pnlZoom.Width * dTime) - (
             frmDosingCalendar.shapeZoomDose(giZoomDosesCreated).Width / 2)
            frmDosingCalendar.shapeZoomDose(giZoomDosesCreated).ToolTipText = Format$(dTime, gsTimeDisplayFormat)
            frmDosingCalendar.shapeZoomDose(giZoomDosesCreated).Visible = True
            frmDosingCalendar.shapeZoomDose(giZoomDosesCreated).ZOrder
        End If
    Next i

    For i = 1 To giNonCompliedDosesCreated
        lDoseDay = frmDosingCalendar.shapeDoseNonComply(i).Tag          'get the day that the dose was taken on
        If Int(PAT_DATA.dEventDate(lDoseDay)) = lCalendarDate Then
            'Create another clone of the the Dose shape located in the array Dose(0)
            giZoomDosesCreated = giZoomDosesCreated + 1          'increment Dose counter
            Load frmDosingCalendar.shapeZoomDose(giZoomDosesCreated)          'create a new Dose
            dTime = PAT_DATA.dEventDate(lDoseDay) - Int(PAT_DATA.dEventDate(lDoseDay))
            frmDosingCalendar.shapeZoomDose(giZoomDosesCreated).Left = (frmDosingCalendar.pnlZoom.Width * dTime) - (
             frmDosingCalendar.shapeZoomDose(giZoomDosesCreated).Width / 2)
            frmDosingCalendar.shapeZoomDose(giZoomDosesCreated).ToolTipText = Format$(dTime, gsTimeDisplayFormat)
            frmDosingCalendar.shapeZoomDose(giZoomDosesCreated).Visible = True
            frmDosingCalendar.shapeZoomDose(giZoomDosesCreated).ZOrder
        End If
    Next i

    frmDosingCalendar.pnlZoom.Caption = Format$(frmDosingCalendar.Calendar.Date, "General Date") + " Detail View"

    'update position of time scale
    For I = 2 To 22 Step 2
        frmDosingCalendar.lblDetailTime(I).Left = (frmDosingCalendar.pnlZoom.Width * (I / 24)) - (frmDosingCalendar.lblDetailTime(I).Width
         / 2)
    Next I
    frmDosingCalendar.shapeDayLight(2).Width = frmDosingCalendar.pnlZoom.Width * 0.53
    frmDosingCalendar.shapeDayLight(1).Width = frmDosingCalendar.pnlZoom.Width * 0.03
    frmDosingCalendar.shapeDayLight(3).Width = frmDosingCalendar.shapeDayLight(1).Width
    frmDosingCalendar.shapeDayLight(2).Left = (frmDosingCalendar.pnlZoom.Width - frmDosingCalendar.shapeDayLight(2).Width) / 1.8
    frmDosingCalendar.shapeDayLight(1).Left = 20 + frmDosingCalendar.shapeDayLight(2).Left - frmDosingCalendar.shapeDayLight(1).
     Width
    frmDosingCalendar.shapeDayLight(3).Left = frmDosingCalendar.shapeDayLight(2).Left + frmDosingCalendar.shapeDayLight(2).Width
     - 15

    bProcedureInProgress = False

End Sub
```

Private Sub MoveFormObjects(frm As Form, XOffset As Integer, YOffset As Integer, VisibleOnly As Integer)

```
    ' This routine moves all objects on a form by the specifed amount
    ' Argument      Description
    ' frm           Form object
    ' XOffset       offset (in twips) to move in x plane.  Positive is to the right
    ' YOffset       offset (in twips) to move in y plane.  Positive is down.
    ' VisibleOnly   If true only move visible objects
    Dim I As Integer
    On Error GoTo Error_MoveFormObjects

    ' loop through all the forms on the form
    For I = 0 To frm.Controls.Count - 1
        ' if 1) the processing only visible controls and the controls is visible
        ' or 2) processing all controls
        If frm.Controls(I).Tag <> "contained" Then
            If (VisibleOnly And frm.Controls(I).Visible) Or Not VisibleOnly Then
                ' reset left and top properties
                frm.Controls(I).Left = frm.Controls(I).Left + XOffset
                frm.Controls(I).Top = frm.Controls(I).Top + YOffset
            End If
        End If
    Next I
```

```
Exit_MoveFormObjects:
    Exit Sub

Error_MoveFormObjects:
    Resume Exit_MoveFormObjects

End Sub
```

```
Private Sub DrawSingleCompliedDoseTaken(iDay As Integer, dTime As Double, iEventNumber As Integer, iPlo
    'Draw dosing Doses for the day of the month and time of day passed in here.
    'Time is expressed in decimal places as a portion of a day (VB time format)
    'NOTE: No checks are currently made to determine whether the event is a med event or
    'a non-med event. If both events are kept in the same array, then a test of the med bit
    'must be done before plotting.
    'A Dose is not visible when first created. The caller should display the Doses once they
    'are all created, so as to speed the redraw of the screen.
    'Create another clone of the the Dose shape located in the array Dose(0)
    On Error Resume Next
    Dim I As Integer, lWeekDay As Integer
    Dim lDoseLeft As Single, lDoseTop As Single
    Dim lTemp As Long, lDayWidth As Long, lDayHeight As Long

    giCompliedDosesCreated = giCompliedDosesCreated + 1          'increment Dose counter
    Load frmDosingCalendar.shapeDose(giCompliedDosesCreated)          'create a new Dose

    '_______________
    'These lines are a work-around for a bug in the control that causes it to
    'return the wrong values for day.left, day.top, etc. When fixed, we can simply use those properties
    'and remove these calculations.
    lDayWidth = (frmDosingCalendar.Calendar.Width - 50) / 7          'actual scalewidth of a single day
    lWeekDay = (frmDosingCalendar.Calendar.DayLeft(iDay) * 26) / lDayWidth          'approximate location of the day
    '_______________

    lDoseLeft = (lWeekDay * lDayWidth)          'get left edge of day to plot
    lDoseLeft = lDoseLeft + ((lDayWidth / 5) * iPlotPosition - 1) - (lDayWidth / 10)
    frmDosingCalendar.shapeDose(giCompliedDosesCreated).Left = lDoseLeft


    '_______________
    'These lines are a work-around for a bug in the control that causes it to
    'return the wrong values for day.left, day.top, etc. When fixed, we can simply use those properties
    'and remove these calculations.
    'The control is even moe stupid than I first supected. It can not always return the proper vertical
    'location of a day, thus, we have to jump through more hoops to figure out what week that a particular
    'day is in.
    lDayHeight = (frmDosingCalendar.Calendar.Height - 50) - 625          'an offset is used to compensate for height of title
    lDayHeight = lDayHeight / 6
    lWeekDay = (frmDosingCalendar.Calendar.DayLeft(1) * 26) / lDayWidth          'the approximate location of the day
    lTemp = Int((iDay + lWeekDay - 1) / 7)
    '_______________

    lDoseTop = (lTemp * lDayHeight) + 625          'this number factors in the title bar
    lDoseTop = lDoseTop + lDayHeight - 25 - frmDosingCalendar.shapeDose(0).Height          'draw in bottom of day
    frmDosingCalendar.shapeDose(giCompliedDosesCreated).Top = lDoseTop
    frmDosingCalendar.shapeDose(giCompliedDosesCreated).Tag = iEventNumber          'keep event number for updating the zoom box

    On Error GoTo 0
End Sub
```

```
Private Sub DrawSingleDoseMissed(iDay As Integer, iPlotPosition As Integer)
    'Draw doses for the day of the month passed in here
    'NOTE: No checks are currently made to determine whether the event is a med event or
    'a non-med event. A test of the med bit must be done before calling this procedure.
    'A Dose is not visible when first created  The caller should display the Doses once they
    'are all created. so as to speed the redraw of the screen.

    On Error Resume Next
    Dim I As Integer, lWeekDay As Integer
    Dim lDoseLeft As Single, lDoseTop As Single
    Dim lTemp As Long, lDayWidth As Long, lDayHeight As Long

    giDosesMissedCreated = giDosesMissedCreated + 1                'increment Dose counter
    'Create another clone of the the Dose shape located in the array Dose(0)
    Load frmDosingCalendar.shapeDoseMissed(giDosesMissedCreated)       'create a new Dose
    '-------------
    'These lines are a work-around for a bug in the control that causes it to
    'return the wrong values for day.left. day.top. etc.  When fixed. we can simply use these properties
    'and remove these calculations.
    lDayWidth = (frmDosingCalendar.Calendar.Width - 50) / 7               'actual scalewidth of a single day
    lWeekDay = (frmDosingCalendar.Calendar.DayLeft(iDay) * 26) / lDayWidth       'approximate location of the day
    '-------------

    lDoseLeft = (lWeekDay * lDayWidth)      'get left edge of day to plot
    lDoseLeft = lDoseLeft + ((lDayWidth / 5) * (iPlotPosition - 1) - (lDayWidth / 10)
    frmDosingCalendar.shapeDoseMissed(giDosesMissedCreated).Left = lDoseLeft

    '-------------
    'These lines are a work-around for a bug in the control that causes it to
    'return the wrong values for day.left. day.top. etc.  When fixed. we can simply use those properties
    'and remove these calculations.
    'The control is even moe stupid than I first supected.  It can not always return the proper vertical
    'location of a day. thus. we have to jump through more hoops to figure out what week that a particular
    'day is in.
    lDayHeight = (frmDosingCalendar.Calendar.Height - 50) - 625        'an offset is used to compensate for height of title
    lDayHeight = lDayHeight / 6
    lWeekDay = (frmDosingCalendar.Calendar.DayLeft(1) * 26) / lDayWidth           'the approximate location of the day
    lTemp = Int((iDay + lWeekDay - 1) / 7)
    '-------------

    lDoseTop = (lTemp * lDayHeight) + 625      'this number factors in the title bar
    lDoseTop = lDoseTop + lDayHeight - 75 - frmDosingCalendar.shapeDose(0).Height - frmDosingCalendar.shapeDose(0).Height -
     frmDosingCalendar.shapeDose(0).Height      'draw in bottom of day
    frmDosingCalendar.shapeDoseMissed(giDosesMissedCreated).Top = lDoseTop

    On Error GoTo 0
End Sub
```

```
Public Sub UpdateCalendar()
    'The month or year fo the calendar has changed. so we need to plot the events for
    'the current month and year being shown.

    Static bProcedureInProgress As Boolean
    If bProcedureInProgress Then Exit Sub
    bProcedureInProgress = True

    Dim lObjectDiameter As Integer

    'Show custom labels from config file if there were any
    If Len(gsCustomLblPatientLastName) > 0 Then frmDosingCalendar.Label1 = gsCustomLblPatientLastName
    frmDosingCalendar.lblPatientName = " " + PAT_DATA.sPatientLastName + ", " + PAT_DATA.sPatientFirstName

    lObjectDiameter = frmDosingCalendar.Calendar.Width / 45        'resize the objects drawn on the calendar
    If lObjectDiameter > frmDosingCalendar.Calendar.Height / 50 Then lObjectDiameter = frmDosingCalendar.Calendar.Height / 50
    frmDosingCalendar.shapeDose(0).Width = lObjectDiameter
    frmDosingCalendar.shapeDose(0).Height = lObjectDiameter
    frmDosingCalendar.shapeDoseNonComply(0).Width = lObjectDiameter
    frmDosingCalendar.shapeDoseNonComply(0).Height = lObjectDiameter
    frmDosingCalendar.shapeDoseMissed(0).Width = lObjectDiameter
    frmDosingCalendar.shapeDoseMissed(0).Height = lObjectDiameter
'   frmDosingCalendar.shapeDoseSizeChange(0).Width = lObjectDiameter
'   frmDosingCalendar.shapeDoseSizeChange(0).Height = lObjectDiameter

    DrawAllCompliedDosesTaken
    DrawAllNonCompliedDosesTaken
    DrawAllDosesMissed
    DrawAllDoseSizeChanges

    UpdateZoomBox

    bProcedureInProgress = False
End Sub

Public Sub RemoveAllObjects()
    'Remove all objects from calendar
    RemoveCompliedDosesTaken
    RemoveDosesMissed
    DoEvents
End Sub
```

frmMain.frm - File Declarations

```
Attribute VB_Name = "frmMain"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
```

```
Private Sub CommTimer_Timer()
  gbCommTimerExpired = True
  CommTimer.Enabled = False
End Sub
```

```
Private Sub FaxMan1_ConfigurationDone()
  Dim I As Integer
  frmOptions.MousePointer = vbDefault
  frmOptions.btnConfigureFax.Enabled = True
  SetFaxDeviceLabel
End Sub
```

```
Private Sub FaxMan1_FaxStatus(Device As Integer, Status As Integer)
  Beep
  If gcFax.Status(Device) = "Initializing Modem" Or gcFax.Status(Device) = "Answering" Then
    frmFaxStatus.Show
  ElseIf gcFax.Status(Device) = "Port Closed" Then
    Unload frmFaxStatus
  End If

  frmFaxStatus.lblRemoteID = gcFax.StatusRemoteID(Device)

  If gcFax.StatusConnectSpeed(Device) > 0 Then
    frmFaxStatus.lblSpeed = gcFax.StatusConnectSpeed(Device)
  Else
    frmFaxStatus.lblSpeed = ""
  End If

  If gcFax.StatusPages(Device) Then
    frmFaxStatus.lblPage = CStr(gcFax.StatusPagesSent(Device)) + " of " + Str$(gcFax.StatusPages(Device))
  Else
    frmFaxStatus.lblPage = CStr(gcFax.StatusPagesSent(Device))
  End If

  If gcFax.StatusPercentage(Device) > 0 Then
    frmFaxStatus.lblPercent = CStr(gcFax.StatusPercentage(Device)) + " % Complete"
  Else
    frmFaxStatus.lblPercent = ""
  End If

  frmFaxStatus.lblStatus = gcFax.Status(Device)
  frmFaxStatus.lblDestination = gcFax.StatusDestination(Device)
  frmFaxStatus.lblFaxNumber = gcFax.StatusNumber(Device)
End Sub
```

```
Private Sub MDIForm_Load()
   On Error Resume Next
   Me.Left = CLng(GetINISetting(gsAppIniFileSpec, "Windows", "Main Left", "1000"))
   Me.Top = CLng(GetINISetting(gsAppIniFileSpec, "Windows", "Main Top", "1000"))
   Me.Width = CLng(GetINISetting(gsAppIniFileSpec, "Windows", "Main Width", "8500"))
   Me.Height = CLng(GetINISetting(gsAppIniFileSpec, "Windows", "Main Height", "6500"))
'  Me.WindowState = CLng(GetINISetting(gsAppIniFileSpec, "Windows", "Main WindowState", "0"))
   On Error GoTo 0
End Sub
```

```
Private Sub MDIForm_Unload(Cancel As Integer)
   Dim r As Integer

   r = ValidatePatientDataSaved   'make sure any device data has first been saved
   'Save Window positions
   If Me.WindowState <> vbMinimized Then
      SaveINISetting gsAppIniFileSpec, "Windows", "Main Left", CStr(Me.Left)
      SaveINISetting gsAppIniFileSpec, "Windows", "Main Top", CStr(Me.Top)
      SaveINISetting gsAppIniFileSpec, "Windows", "Main Width", CStr(Me.Width)
      SaveINISetting gsAppIniFileSpec, "Windows", "Main Height", CStr(Me.Height)
      SaveINISetting gsAppIniFileSpec, "Windows", "Main WindowState", CStr(Me.WindowState)
   End If

   SaveProgramPreferences
End Sub
```

```
Private Sub mnuAccessWebSite_Click()
   'if the form is minimized then set it back to normal
   Call LogonToWebSite
   If frmBrowser.WindowState = vbMinimized Then
      frmBrowser.WindowState = vbNormal
   End If
   frmBrowser.ZOrder
End Sub
```

```
Private Sub mnuFaxConfigure_Click()
   giLatestOptionsTabSelected = 2     'display the fax tab once the dialog is opened
   frmOptions.Show vbModal
End Sub
```

```
Private Sub mnuFaxSend_Click()
   frmFaxSend.Show
End Sub
```

```
Private Sub mnuFaxViewLogs_Click()
   frmFaxLog.Show
End Sub
```

```
Private Sub mnuFileProperties_Click()
   frmOptions.Show vbModal
End Sub
```

```
Private Sub mnuFileSave_Click()
   Dim r As Integer

   If PAT_DATA.sPatientDataFileName = "" Then
      r = SaveDataToNewFile
   Else
      r = SavePatientData(PAT_DATA.sPatientDataFileName)
   End If

   If r = False Then
      Beep
      MsgBox "An error occurred while attempting to save the data file.  It was not saved.", vbCritical, "File Not Saved"
   End If
End Sub
```

```
Private Sub mnuGenError_Click()
   MsgBox "This is a temporary test error handler.  When you click OK, a synthethic error (Divide by 0) will be generated.  The same dialog
   will be shown when any error is generated.  It generates a log file that provides valuable information for the developer.  This will be
   removed from the next build.", vbInformation, "Test Error Handler"
   Error 11
End Sub
```

```
Private Sub mnuHelpDeviceDiag_Click()
   Dim sMSG, sReply As String
   sMSG = "Performing a device diagnostics test could cause loss of vital device information and should be done only with the assistance
   of technical support."
   sMSG = sMSG + vbCrLf + vbCrLf + "Please contact our technical support department at 1-800-777-7777 for a password and assistance
   ."

   ' Display message, title, and default value.
   sReply = InputBox(sMSG, "Password Required")
   If LCase$(sReply) = "h2o" Then frmDeviceDiagnostics.Show
End Sub
```

```
Private Sub mnuHelpTips_Click()
   frmTip.Show
   'If the form is minimized then set it back to normal
   If frmTip.WindowState = vbMinimized Then frmTip.WindowState = vbNormal
   frmTip.ZOrder
End Sub
```

```
Private Sub mnuReadDeviceData_Click()
   frmReadDeviceData.Show
   'if the form is minimized then set it back to normal
   If frmReadDeviceData.WindowState = vbMinimized Then frmReadDeviceData.WindowState = vbNormal
   frmReadDeviceData.ZOrder
End Sub
```

```
Private Sub mnuSendDeviceData_Click()
   frmDeviceInitialize.Show
   'if the form is minimized then set it back to normal
   If frmDeviceInitialize.WindowState = vbMinimized Then frmDeviceInitialize.WindowState = vbNormal
   frmDeviceInitialize.ZOrder
End Sub
```

```
Private Sub mnuViewAllPatients_Click()
   frmAllPatients.Show
   'if the form is minimized then set it back to normal
   If frmAllPatients.WindowState = vbMinimized Then frmAllPatients.WindowState = vbNormal
   frmAllPatients.ZOrder
End Sub
```

```
Private Sub mnuHelpAbout_Click()
   frmAbout.Show vbModal, Me
End Sub
```

```
Private Sub mnuViewCalendar_Click()
   frmDosingCalendar.Show
   'if the form is minimized then set it back to normal
   If frmDosingCalendar.WindowState = vbMinimized Then frmDosingCalendar.WindowState = vbNormal
   frmDosingCalendar.ZOrder
End Sub
```

```
Private Sub mnuViewExplorer_Click()
   mnuViewExplorer.Checked = Not mnuViewExplorer.Checked        'toggle the state of the check box
   SSListBar1.Visible = mnuViewExplorer.Checked
End Sub
```

```
Private Sub mnuViewOptions_Click()
   frmOptions.Show vbModal, Me
End Sub
```

```
Private Sub mnuViewPatientDosingReport_Click()
    frmPatientDosingReport.Show
    'if the form is minimized then set it back to normal
    If frmPatientDosingReport.WindowState = vbMinimized Then frmPatientDosingReport.WindowState = vbNormal
    frmPatientDosingReport.ZOrder
End Sub
```

```
Private Sub mnuViewPatientSummary_Click()
    frmPatientSummary.Show
    'if the form is minimized then set it back to normal
    If frmPatientSummary.WindowState = vbMinimized Then frmPatientSummary.WindowState = vbNormal
    frmPatientSummary.ZOrder
End Sub
```

```
Private Sub mnuViewStatusBar_Click()
    If mnuViewStatusBar.Checked Then
        sbStatusBar.Visible = False
        mnuViewStatusBar.Checked = False
    Else
        sbStatusBar.Visible = True
        mnuViewStatusBar.Checked = True
    End If
End Sub
```

```
Private Sub mnuViewToolbar_Click()
    If mnuViewToolbar.Checked Then
        tbToolBar.Visible = False
        mnuViewToolbar.Checked = False
    Else
        tbToolBar.Visible = True
        mnuViewToolbar.Checked = True
    End If
End Sub
```

```
Private Sub SSListBar1_ListItemClick(ByVal ItemClicked As Listbar.SSListItem)

    Select Case SSListBar1.CurrentGroupKey
        Case "Patient Data"     'patient data
            Select Case ItemClicked.Key
                Case "Event Calendar"          'calendar
                mnuViewCalendar_Click

                Case "Summary"                 'summary
                mnuViewPatientSummary_Click

                Case "Dosing Information"      'grid
                mnuViewPatientDosingReport_Click

                Case "All Patients"            'all patients
                mnuViewAllPatients_Click

            End Select


        Case "Device"     'device data
            Select Case ItemClicked.Key
```

frmMain.frm - SSListBar1_ListItemClick

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```
            Case "Retrieve Data"          'read device data
              mnuReadDeviceData_Click

            Case "Program Device"         'send to DosPro Device
              mnuSendDeviceData_Click
        End Select
    End Select
End Sub
```

Private Sub tbToolBar_ButtonClick(ByVal Button As ComctlLib.Button)

```
    Select Case Button.Key

      Case "Open"
        mnuFileOpen_Click

      Case "Save"
        mnuFileSave_Click

      Case "Print"
        mnuFilePrint_Click

      Case "Cut"
        'mnuEditCut_Click

      Case "Copy"
        'mnuEditCopy_Click
        Clipboard.Clear
        If TypeOf ActiveForm.ActiveControl Is TextBox Then
          Select Case Index
            Case 0  ' Cut.
              Copy selected text to Clipboard.

              Clipboard.SetText ActiveForm.ActiveControl.SelText
              Delete selected text.
              ActiveForm.ActiveControl.SelText = ""
            Case 1  ' Copy.
              Copy selected text to Clipboard.

            Clipboard.SetText ActiveForm.ActiveControl.SelText
            Case 2  ' Paste.
              Put Clipboard text in text box.
              ActiveForm.ActiveControl.SelText = Clipboard.GetText()
            Case 3  ' Delete.
              Delete selected text.
              ActiveForm.ActiveControl.SelText = ""
```

frmMain.frm - tbToolBar_ButtonClick

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```
            End Select
          End If

        Case "Paste"
          'mnuEditPaste_Click

        Case "Bold"

        Case "Italic"

        Case "Underline"

        Case "Left"

        Case "Center"

        Case "Right"

    End Select
End Sub
```

```
Private Sub mnuHelpContents_Click()
    Dim nRet As Integer

    'if there is no helpfile for this project display a message to the user
    'you can set the HelpFile for your application in the
    'Project Properties dialog
    If Len(App.HelpFile) = 0 Then
        MsgBox "Unable to display Help Contents. There is no Help associated with this project.", vbInformation, Me.Caption
    Else
        On Error Resume Next
        nRet = OSWinHelp(Me.hWnd, App.HelpFile, 3, 0)
        If Err Then MsgBox Err.Description
    End If
End Sub
```

```
Private Sub mnuHelpSearch_Click()
    Dim nRet As Integer

    'if there is no helpfile for this project display a message to the user
    'you can set the HelpFile for your application in the
    'Project Properties dialog
    If Len(App.HelpFile) = 0 Then
        MsgBox "Unable to display Help Contents. There is no Help associated with this project.", vbInformation, Me.Caption
    Else
        On Error Resume Next
        nRet = OSWinHelp(Me.hWnd, App.HelpFile, 261, 0)
        If Err Then MsgBox Err.Description
    End If
End Sub
```

```
Private Sub mnuWindowArrangeIcons_Click()
    Me.Arrange vbArrangeIcons
End Sub

Private Sub mnuWindowCascade_Click()
    Me.Arrange vbCascade
End Sub

Private Sub mnuWindowTileHorizontal_Click()
    Me.Arrange vbTileHorizontal
End Sub

Private Sub mnuWindowTileVertical_Click()
    Me.Arrange vbTileVertical
End Sub

Private Sub mnuFileOpen_Click()
    Dim r As Integer
    r = OpenPatientData("")

    'If any of these forms are open at the time a new file is loaded,
    'then refresh them.
    For r = 0 To Forms.Count - 1
        Select Case Forms(r).Name
            Case "frmPatientDosingReport"
                frmPatientDosingReport.UpdatePatientGridDisplay

            Case "frmDosingCalendar"
                UpdateCalendar

            Case "frmPrint"
                RefreshPreview

        End Select
    Next r
End Sub

Private Sub mnuFileSaveAs_Click()
    SaveDataToNewFile
End Sub
```

```
Private Sub mnuFilePageSetup_Click()
    On Error GoTo mnuFilePageSetup_Click_Error

    dlgCommonDialog.ShowPrinter

mnuFilePageSetup_Click_Exit:
    On Error GoTo 0
    Exit Sub

mnuFilePageSetup_Click_Error:
    Resume mnuFilePageSetup_Click_Exit     'any error message would have already been sent by the common dialog
End Sub
```

```
Private Sub mnuFilePrint_Click()
    frmPrint.Show
    'if the form is minimized then set it back to normal
    If frmPrint.WindowState = vbMinimized Then frmPrint.WindowState = vbNormal
    frmPrint.ZOrder
End Sub
```

```
Private Sub mnuFileSend_Click()
    'To Do
    MsgBox "Ability to send a file will be active in a future release"
End Sub
```

```
Private Sub mnuFileMRU_Click(Index As Integer)
    Dim r As Integer
    r = OpenPatientData(mnuFileMRU(Index).Caption)
End Sub
```

```
Private Sub mnuFileExit_Click()
    'unload the form
    Unload Me
End Sub
```

frmSplash.frm - File Declarations

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```
Attribute VB_Name = "frmSplash"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
```

```
Private Sub Form_Load()
   lblVersion.Caption = "Version " & App.Major & "." & App.Minor       ' + "." + App.Revision
   lblProductName.Caption = App.Title
End Sub
```

frmLogin.frm - File Declarations

```
Attribute VB_Name = "frmLogin"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit

Private Declare Function GetUserName Lib "advapi32.dll" Alias "GetUserNameA" (ByVal lpbuffer As String, nSize As Long) As Long
Public OK As Boolean
```

```
Private Sub Form_Load()
    Dim sBuffer As String
    Dim lSize As Long

    Me.Move frmSplash.Left + 4000, frmSplash.Top + 3500

    sBuffer = Space$(255)
    lSize = Len(sBuffer)
    Call GetUserName(sBuffer, lSize)
    If lSize > 0 Then
        txtUserName = Left$(sBuffer, lSize)
    Else
        txtUserName = vbNullString
    End If
End Sub
```

```
Private Sub cmdCancel_Click()
    OK = False
    Me.Hide
End Sub
```

```
Private Sub cmdOK_Click()
    'To Do - create test for correct password
    'check for correct password
    Me.MousePointer = vbHourglass
    If txtPassword = "" Then
        OK = True
        imgLocked.Visible = False
        imgUnlocked.Visible = True
        Wait 1.5
        Me.MousePointer = vbDefault
        Me.Hide

    Else
        imgLocked.Visible = False
        Wait 0.05
        imgLocked.Visible = True
        Wait 0.05
        imgLocked.Visible = False
        Wait 0.05
        imgLocked.Visible = True
        Wait 0.05
        imgLocked.Visible = False
        Wait 0.05
        imgLocked.Visible = True
        Me.MousePointer = vbDefault
        Beep
        MsgBox "Invalid Password, try again.", , "Login"
        txtPassword.SetFocus
        txtPassword.SelStart = 0
        txtPassword.SelLength = Len(txtPassword)
    End If
End Sub
```

frmOptions.frm - File Declarations

```
Attribute VB_Name = "frmOptions"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
```

```
Private Sub btnConfigureFax_Click()
  btnConfigureFax.Enabled = False
  Me.MousePointer = vbHourglass
  gcFax.AutoDetect
  With lblFaxDevice
    .Caption = "Searching for a Fax Device.  Please wait a few seconds."
    .BackColor = &HC0FFFF        'highlight background
    .ForeColor = &H0&
    .Refresh
  End With
End Sub
```

```
Private Sub cmdApply_Click()
  Dim sSection As String

  giLatestOptionsTabSelected = sstab1.Tab

  'set the global value to the user's selection
  gsDateDisplayFormat = Choose(cmboDates.ListIndex + 1, "Short Date", "Medium Date", "Long Date")
  gsTimeDisplayFormat = Choose(cmboTimes.ListIndex + 1, "Short Time", "Medium Time", "Long Time")
  Select Case cmboComplianceTimeRange.ListIndex
    Case 0
      gsngComplianceTimeRange = 0.5
    Case 1
      gsngComplianceTimeRange = 1
    Case 2
      gsngComplianceTimeRange = 1.5
    Case 3
      gsngComplianceTimeRange = 2
    Case 4
      gsngComplianceTimeRange = 2.5
    Case 5
      gsngComplianceTimeRange = 3
    Case 6
      gsngComplianceTimeRange = 3.5
    Case 7
      gsngComplianceTimeRange = 4
    Case 8
      gsngComplianceTimeRange = 4.5
    Case 9
      gsngComplianceTimeRange = 5
    Case 10
      gsngComplianceTimeRange = 5.5
    Case 11
      gsngComplianceTimeRange = 6
  End Select

  RefreshAllOpenForms

  'Save the Fax Information
  With FAX_DATA
    .sSenderName = txtName
    .sSenderCompany = txtCompany
    .sSenderVoiceNumber = txtVoiceNumber
    .sSenderFaxNumber = txtFaxNumber
```

```
        .sFaxID = txtFaxID
        .sDialPrefix = txtDialPrefix
        .iRetries = Val(txtRetries)
        .iRetryInterval = Val(txtRetryInterval)
        .bFaxResolution = chkResolution.Value     '0=low, 1 = high
    End With

    'Save values for the Fax control that was last set by user
    sSection = "User Selections"
    With FAX_DATA
        SaveINISetting gsFaxFileSpec, sSection, "Sender Name", .sSenderName
        SaveINISetting gsFaxFileSpec, sSection, "Sender Company", .sSenderCompany
        SaveINISetting gsFaxFileSpec, sSection, "Sender Voice Number", .sSenderVoiceNumber
        SaveINISetting gsFaxFileSpec, sSection, "Sender Fax Number", .sSenderFaxNumber
        SaveINISetting gsFaxFileSpec, sSection, "Fax ID", .sFaxID
        SaveINISetting gsFaxFileSpec, sSection, "Dial Prefix", .sDialPrefix
        SaveINISetting gsFaxFileSpec, sSection, "Retries", CStr(.iRetries)
        SaveINISetting gsFaxFileSpec, sSection, "Retry Interval", CStr(.iRetryInterval)
        SaveINISetting gsFaxFileSpec, sSection, "Resolution", CStr(.bFaxResolution)
    End With
End Sub
```

```
Private Sub cmdCancel_Click()
    Unload Me
End Sub
```

```
Private Sub cmdOK_Click()
    '"Code goes here to set options and close dialog."
    cmdApply_Click
    Unload Me
End Sub
```

```
Private Sub Form_Activate()
    SetPrinterIcon False,
End Sub
```

```
Private Sub Form_Load()
    'Define the mask for the telephone and fax numbers text box
    'Load the available choices into the list boxes
    cmboDates.AddItem Format$(Now, "Short Date")
    cmboDates.AddItem Format$(Now, "Medium Date")
    cmboDates.AddItem Format$(Now, "Long Date")

    cmboTimes.AddItem Format$(Now, "Short Time") + "    (24 hour)"
    cmboTimes.AddItem Format$(Now, "Medium Time") + "    (12 hour)"
    cmboTimes.AddItem Format$(Now, "Long Time")

    Select Case gsngComplianceTimeRange
        Case 0.5
            cmboComplianceTimeRange.ListIndex = 0
        Case 1
            cmboComplianceTimeRange.ListIndex = 1
        Case 1.5
            cmboComplianceTimeRange.ListIndex = 2
        Case 2
            cmboComplianceTimeRange.ListIndex = 3
        Case 2.5
            cmboComplianceTimeRange.ListIndex = 4
```

frmOptions.frm - Form_Load

```
        Case 3
            cmboComplianceTimeRange.ListIndex = 5
        Case 3.5
            cmboComplianceTimeRange.ListIndex = 6
        Case 4
            cmboComplianceTimeRange.ListIndex = 7
        Case 4.5
            cmboComplianceTimeRange.ListIndex = 8
        Case 5
            cmboComplianceTimeRange.ListIndex = 9
        Case 5.5
            cmboComplianceTimeRange.ListIndex = 10
        Case 6
            cmboComplianceTimeRange.ListIndex = 11
    End Select


    'set the list box to the last selected user state/
    Select Case gsDateDisplayFormat
        Case ""
            cmboDates.ListIndex = 0

        Case "Short Date"
            cmboDates.ListIndex = 0

        Case "Medium Date"
            cmboDates.ListIndex = 1

        Case "Long Date"
            cmboDates.ListIndex = 2

    End Select

    Select Case gsTimeDisplayFormat
        Case ""
            cmboTimes.ListIndex = 0

        Case "Short Time"
            cmboTimes.ListIndex = 0

        Case "Medium Time"
            cmboTimes.ListIndex = 1

        Case "Long Time"
            cmboTimes.ListIndex = 2

    End Select


    'Get Fax Info from global settings to the Fax Tab
    With FAX_DATA
        txtName = .sSenderName
        txtCompany = .sSenderCompany
        txtVoiceNumber = .sSenderVoiceNumber
        txtFaxNumber = .sSenderFaxNumber
        txtFaxID = .sFaxID
        txtDialPrefix = .sDialPrefix
        txtRetries = CStr(.iRetries)
        txtRetryInterval = CStr(.iRetryInterval)
        chkResolution.Value = .bFaxResolution     'o=low, 1=high
    End With

    sstab1.Tab = giLatestOptionsTabSelected
    SetFaxDeviceLabel   'update the devices label
End Sub
```

```
Private Sub sstab1_Click(PreviousTab As Integer)
    'fax tab
    If sstab1.Tab = 2 Then SetFaxDeviceLabel      'update the devices label
End Sub
```

```
Private Sub txtFaxNumber_GotFocus()
    txtFaxNumber.SelStart = 1
End Sub
```

```
Private Sub txtRetries_GotFocus()
    txtRetries.SelStart = 1
End Sub
```

```
Private Sub txtRetryInterval_GotFocus()
    txtRetryInterval.SelStart = 1
End Sub
```

```
Private Sub txtVoiceNumber_GotFocus()
    txtVoiceNumber.SelStart = 1
End Sub
```

```
Attribute VB_Name = "frmAbout"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit

' Reg Key Security Options...
Const KEY_ALL_ACCESS = &H2003F


' Reg Key ROOT Types...
Const HKEY_LOCAL_MACHINE = &H80000002
Const ERROR_SUCCESS = 0
Const REG_SZ = 1                     ' Unicode nul terminated string
Const REG_DWORD = 4                    ' 32-bit number


Const gREGKEYSYSINFOLOC = "SOFTWARE\Microsoft\Shared Tools Location"
Const gREGVALSYSINFOLOC = "MSINFO"
Const gREGKEYSYSINFO = "SOFTWARE\Microsoft\Shared Tools\MSINFO"
Const gREGVALSYSINFO = "PATH"


Private Declare Function RegOpenKeyEx Lib "advapi32" Alias "RegOpenKeyExA" (ByVal hKey As Long, ByVal lpSubKey As String, ByVal
↳ ulOptions As Long, ByVal samDesired As Long, ByRef phkResult As Long) As Long
Private Declare Function RegQueryValueEx Lib "advapi32" Alias "RegQueryValueExA" (ByVal hKey As Long, ByVal lpValueName As String,
↳ ByVal lpReserved As Long, ByRef lpType As Long, ByVal lpData As String, ByRef lpcbData As Long) As Long
Private Declare Function RegCloseKey Lib "advapi32" (ByVal hKey As Long) As Long
```

```
Private Sub Form_Load()
  lblVersion.Caption = "Version " + App.Major + "." + App.Minor + "." + App.Revision
'  lblTitle.Caption = App.Title
End Sub
```

```
Private Sub cmdSysInfo_Click()
    Call StartSysInfo
End Sub
```

```
Private Sub cmdOK_Click()
    Unload Me
End Sub
```

```
Public Sub StartSysInfo()
  On Error GoTo SysInfoErr


  Dim rc As Long
  Dim SysInfoPath As String


  ' Try To Get System Info Program Path\Name From Registry...
  If GetKeyValue(HKEY_LOCAL_MACHINE, gREGKEYSYSINFO, gREGVALSYSINFO, SysInfoPath) Then
    ' Try To Get System Info Program Path Only From Registry...
  ElseIf GetKeyValue(HKEY_LOCAL_MACHINE, gREGKEYSYSINFOLOC, gREGVALSYSINFOLOC, SysInfoPath) Then
    ' Validate Existance Of Known 32 Bit File Version
```

```
        If (Dir(SysInfoPath + "\MSINFO32.EXE") <> "") Then
            SysInfoPath = SysInfoPath + "\MSINFO32.EXE"
            ' Error - File Can Not Be Found...
        Else
            GoTo SysInfoErr
        End If
        ' Error - Registry Entry Can Not Be Found..
    Else
        GoTo SysInfoErr
    End If

    Call Shell(SysInfoPath, vbNormalFocus)
    Exit Sub

SysInfoErr:
    MsgBox "System Information Is Unavailable At This Time", vbOKOnly
End Sub
```

```
Public Function GetKeyValue(KeyRoot As Long, KeyName As String, SubKeyRef As String, ByRef KeyVal As S
    Dim i As Long                                   ' Loop Counter
    Dim rc As Long                                  ' Return Code
    Dim hKey As Long                                ' Handle To An Open Registry Key
    Dim hDepth As Long                              '
    Dim KeyValType As Long                          ' Data Type Of A Registry Key
    Dim tmpVal As String                            ' Tempory Storage For A Registry Key Value
    Dim KeyValSize As Long                          ' Size Of Registry Key Variable
    '------------------------------------------------------------
    ' Open RegKey Under KeyRoot (HKEY_LOCAL_MACHINE...)
    '------------------------------------------------------------
    rc = RegOpenKeyEx(KeyRoot, KeyName, 0, KEY_ALL_ACCESS, hKey)   ' Open Registry Key
    If (rc <> ERROR_SUCCESS) Then GoTo GetKeyError             ' Handle Error...
    tmpVal = String$(1024, 0)                       ' Allocate Variable Space
    KeyValSize = 1024                               ' Mark Variable Size

    '------------------------------------------------------------
    ' Retrieve Registry Key Value...
    '------------------------------------------------------------
    rc = RegQueryValueEx(hKey, SubKeyRef, 0, KeyValType, tmpVal, KeyValSize)   ' Get/Create Key Value
    If (rc <> ERROR_SUCCESS) Then GoTo GetKeyError             ' Handle Errors

    If (Asc(Mid(tmpVal, KeyValSize, 1)) = 0) Then   ' Win95 Adds Null Terminated String...
        tmpVal = Left(tmpVal, KeyValSize - 1)       ' Null Found, Extract From String
    Else                                            ' WinNT Does NOT Null Terminate String...
        tmpVal = Left(tmpVal, KeyValSize)           ' Null Not Found, Extract String Only
    End If
    '------------------------------------------------------------
    ' Determine Key Value Type For Conversion...
    '------------------------------------------------------------
    Select Case KeyValType                          ' Search Data Types...
      Case REG_SZ                                   ' String Registry Key Data Type
        KeyVal = tmpVal                             ' Copy String Value
      Case REG_DWORD                                ' Double Word Registry Key Data Type
        For i = Len(tmpVal) To 1 Step -1            ' Convert Each Bit
          KeyVal = KeyVal + Hex(Asc(Mid(tmpVal, i, 1)))   ' Build Value Char. By Char.
        Next
        KeyVal = Format$("&h" + KeyVal)             ' Convert Double Word To String
    End Select

    GetKeyValue = True                              ' Return Success
    rc = RegCloseKey(hKey)                          ' Close Registry Key
    Exit Function                                   ' Exit

GetKeyError:                    ' Cleanup After An Error Has Occured..
    KeyVal = ""                                     ' Set Return Val To Empty String
```

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```
    GetKeyValue = False                     ' Return Failure
    rc = RegCloseKey(hKey)                  ' Close Registry Key
End Function
```

frmBrowser.frm - File Declarations

```
Attribute VB_Name = "frmBrowser"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit

Public StartingAddress As String
Dim mbDontNavigateNow As Boolean
```

```
Private Sub Form_Load()
  Dim r As Integer

  'On Error Resume Next
  Me.Show
  tbToolBar.Refresh
  Form_Resize

  If Len(StartingAddress) > 0 Then
    cboAddress = StartingAddress
    cboAddress.AddItem cboAddress
    'try to navigate to the starting address
    tmrTimer.Enabled = True
    brwWebBrowser.Navigate StartingAddress
    Me.MousePointer = vbHourglass
  End If
End Sub
```

```
Private Sub brwWebBrowser_DownloadComplete()
  On Error Resume Next
  Me.Caption = brwWebBrowser.LocationName
  Me.MousePointer = vbDefault
End Sub
```

```
Private Sub brwWebBrowser_NavigateComplete(ByVal URL As String)
  Dim i As Integer, r As Integer

  Dim bFound As Boolean
  On Error Resume Next
  Me.Caption = brwWebBrowser.LocationName
  For i = 0 To cboAddress.ListCount - 1
    If cboAddress.List(i) = brwWebBrowser.LocationURL Then
      bFound = True
      Exit For
    End If
  Next i
  mbDontNavigateNow = True
  If bFound Then cboAddress.RemoveItem i
  cboAddress.AddItem brwWebBrowser.LocationURL, 0
  cboAddress.ListIndex = 0
  mbDontNavigateNow = False
  On Error GoTo 0
  Me.MousePointer = vbDefault

  'Last time to visit the Internet
  'Save new date in INI file that an attempt (or success) was made to visit
  'the Internet web site on this date
  r = GetINISetting(gsAppIniFileSpec, "Web Data", "Connection Reminder Days", 100)
  SaveINISetting gsAppIniFileSpec, "Web Data", "Next Web Visit Reminder Date", Format$(Now + r, "Medium Date")
```

```
    SaveINISetting gsAppIniFileSpec, "Web Data", "Last Web Visit Date", Format$(Now, "Medium Date")
End Sub
```

```
Private Sub cboAddress_Click()
    If mbDontNavigateNow Then Exit Sub
    timTimer.Enabled = True
    brwWebBrowser.Navigate cboAddress.Text
    Me.MousePointer = vbHourglass
End Sub
```

```
Private Sub cboAddress_KeyPress(KeyAscii As Integer)
    On Error Resume Next
    If KeyAscii = vbKeyReturn Then cboAddress_Click
End Sub
```

```
Private Sub Form_Resize()
    Me.Refresh
    If Me.WindowState = vbMinimized Then Exit Sub
    brwWebBrowser.Move brwWebBrowser.Left, brwWebBrowser.Top, Me.ScaleWidth - 100, Me.ScaleHeight - (pnlAddress.Top +
    pnlAddress.Height) - 100
    ' brwWebBrowser.Width = Me.ScaleWidth - 100
    ' brwWebBrowser.Height = Me.ScaleHeight - (pnlAddress.Top + pnlAddress.Height) - 100
    cboAddress.Move cboAddress.Left, cboAddress.Top, pnlAddress.Width - cboAddress.Left - 100
End Sub
```

```
Private Sub timTimer_Timer()
    If brwWebBrowser.Busy = False Then
        timTimer.Enabled = False
        Me.Caption = brwWebBrowser.LocationName
    Else
        Me.Caption = "Locating Web Site..."
    End If
End Sub
```

```
Private Sub tbToolBar_ButtonClick(ByVal Button As Button)
    On Error Resume Next
    timTimer.Enabled = True
    Select Case Button.Key
        Case "Back"
            brwWebBrowser.GoBack
        Case "Forward"
            brwWebBrowser.GoForward
        Case "Refresh"
            brwWebBrowser.Refresh
        Case "Home"
            ' brwWebBrowser.GoHome  'normally takes browser to the registered home page
            cboAddress = StartingAddress
            'try to navigate to the starting address
            timTimer.Enabled = True
            brwWebBrowser.Navigate StartingAddress
            Me.MousePointer = vbHourglass

        Case "Search"
            brwWebBrowser.GoSearch
        Case "Stop"
```

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```
            timTimer.Enabled = False
            brwWebBrowser.Stop
            Me.Caption = brwWebBrowser.LocationName
        End Select
    End Sub
```

frmTip.frm - File Declarations

```
Attribute VB_Name = "frmTip"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit

   ' The in-memory database of tips.
   Dim Tips As New Collection

   ' Name of tips file
   Const TIP_FILE = "TIPOFDAY.TXT"
```

```
Private Sub DoNextTip()
   'Index in collection of tip currently being displayed.
   'cycle through the Tips in order

   giCurrentTip = giCurrentTip + 1
   If Tips.Count < giCurrentTip Then giCurrentTip = 1

   ' Show it.
   frmTip.DisplayCurrentTip
End Sub
```

```
Function LoadTips(sFile As String) As Boolean
   Dim NextTip As String    ' Each tip read in from file.
   Dim InFile As Integer    ' Descriptor for file.

   ' Obtain the next free file descriptor.
   InFile = FreeFile

   ' Make sure a file is specified.
   If sFile = "" Then
      LoadTips = False
      Exit Function
   End If

   ' Make sure the file exists before trying to open it.
   If Dir(sFile) = "" Then
      LoadTips = False
      Exit Function
   End If

   ' Read the collection from a text file.
   Open sFile For Input As InFile
   While Not EOF(InFile)
      Line Input #InFile, NextTip
      Tips.Add NextTip
   Wend
   Close InFile

   ' Display a tip at random.
   DoNextTip

   LoadTips = True

End Function
```

frmAllPatients.frm - File Declarations

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```
Attribute VB_Name = "frmAllPatients"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
   Dim xbAllPatientsFormLoading As Boolean
   Dim xsPatientFileSpecs() As String        'a dynamic array holding the names of patient files on disk
```

```
Private Function CalculateSinglePatientCompliance(DataStruct As DeviceDataStruct) As Double
   'Calculate the compliance for the patient in memory and pass result back to caller
   'Use the settings of the dialog to determine calculations and date ranges.

   Dim lDateBegin As Long, lDateEnd As Long, l As Long, lScoreSum As Long
   Dim iPlotValue As Integer       'keeps a tally of the value to be plotted for each day

   lDateBegin = txtStartDate       'Int(DataStruct.dEventDate(1))
   lDateEnd = txtEndDate           'Int(DataStruct.dEventDate(DataStruct.iEventData(0)))

   If lDateBegin Then                          'there is at least a value in there
      Select Case cmboDataToView.ListIndex
         Case 0        'Doses per day score  (all doses on this day regardless of time taken
            For l = lDateBegin To lDateEnd
               iPlotValue = CalcDayDoseScore_AllDoses(DataStruct, l)
               lScoreSum = lScoreSum + iPlotValue
            Next l
            CalculateSinglePatientCompliance = lScoreSum / (lDateEnd - lDateBegin + 1)

         Case 1        'Compliance Doses per day  (on time doses per day)
            For l = lDateBegin To lDateEnd
               iPlotValue = CalcDayDoseScore_OnTime(DataStruct, l)
               lScoreSum = lScoreSum + iPlotValue
            Next l
            CalculateSinglePatientCompliance = lScoreSum / (lDateEnd - lDateBegin + 1)

         Case 2        'Doses Taken
            For l = lDateBegin To lDateEnd
               iPlotValue = CalcDosesSumTakenOnSpecificDay(DataStruct, l)
               lScoreSum = lScoreSum + iPlotValue
            Next l
            CalculateSinglePatientCompliance = lScoreSum / (lDateEnd - lDateBegin + 1)

      End Select
   End If
End Function
```

```
Private Sub btnClose_Click()
   Unload Me
End Sub
```

frmAllPatients.frm - cmboDataToView_Clic

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```
Private Sub cmboDataToView_Click()
   CalculateAllPatientsComplianceOnDisk
   Slider1_SlideChange
End Sub
```

```
Private Sub cmboDateSelection_Click()

   Select Case cmboDateSelection.ListIndex
      Case 0        'recent 7 days
         txtEndDate = CDate(Int(Now))
         txtStartDate = CDate(Int(Now) - 7)

      Case 1        'recent 14 days
         txtEndDate = CDate(Int(Now))
         txtStartDate = CDate(Int(Now) - 14)

      Case 2        'recent 30 days
         txtEndDate = CDate(Int(Now))
         txtStartDate = CDate(Int(Now) - 30)

      Case 3        'recent 6 months
         txtEndDate = CDate(Int(Now))
         txtStartDate = CDate(Int(Now) - 180)

      Case 4        'all data
         If PAT_DATA.iEventData(0) Then      'there are some events in array
'              txtStartDate = CDate(Int(PAT_DATA.dEventDate(1)))
'              txtEndDate = CDate(Int(PAT_DATA.dEventDate(PAT_DATA.iEventData(0))))
         End If

      Case 5        'custom dates
         If gsLastStartDateChosen = "" Then
            txtStartDate = CDate(Int(PAT_DATA.dEventDate(1)))
         Else
            txtStartDate = gsLastStartDateChosen
         End If

         If gsLastEndDateChosen = "" Then
            txtEndDate = CDate(Int(PAT_DATA.dEventDate(PAT_DATA.iEventData(0))))
         Else
            txtEndDate = gsLastEndDateChosen
         End If

   End Select

   CalculateAllPatientsComplianceOnDisk
   Slider1_SlideChange

End Sub
```

```
Private Sub Form_Activate()
   Me.Refresh
   grid.Refresh
   Slider1_SlideChange
   SetPrinterIcon True, "&Print All Patient's Summary..."
End Sub
```

```
Public Sub CalculateAllPatientsComplianceOnDisk()
   'This procedure is called when it is necessary to update the display
   'due to some element or feature being changed.

   'Look at all device data files in the specified directory.
   'Retrieve appropriate data from each file and put into a global
   'structure holding all patients.

   If xbAllPatientsFormLoading = True Then Exit Sub

   Dim r As Integer, I As Integer, dCompliance As Double
   Dim sPath As String, sFileName As String, sFileSpec As String
   Dim sTab As String, sTemp As String, lErrorCode As Long

   On Error GoTo CalculateAllPatientsComplianceOnDisk_error
   Me.MousePointer = vbHourglass
   Me.Refresh

   sTab = Chr$(9)
   ReDim xsPatientFileSpecs(1)      'clear out the old array
   grid.Clear
   grid.Rows = 1
   If cmboDataToView.ListIndex = 2 Then
      'List item number 3 (index 2) was requested to be taken out.  The code is still in the program
      'in case any iteration of it is needed later on.
      grid.FormatString = "< Patient Name |< Patient ID |< Start Date |< Last Dose |> Doses  "
   Else
      grid.FormatString = "< Patient Name |< Patient ID |< Start Date |< Last Dose |> Score  "
   End If

   Form_Resize

   grid.Col = 1          'set to column 1
   grid.Redraw = False   'turn off redraw to speed up processing

   sPath = App.Path + "\Patient Data\"
   sFileName = LCase$(Dir$(sPath + "*.cpd"))          'get all filenames
   Do While sFileName <> ""                          'read all strings from directory
      sFileSpec = sPath + sFileName
      I = I + 1
      'Load the data for this patient into global array
      r = GetPatientDataFromDisk(sFileSpec, TEMP_DATA, lErrorCode)
      'rgh xxx !!!
      'If a checksum error or other error occurred on in the above function,
      'don't include the file in the summary and warn user.


      'Call routine to calculate compliance based on dialog settings
      dCompliance = CalculateSinglePatientCompliance(TEMP_DATA)

      'Put results into grid
      sTemp = TEMP_DATA.sPatientLastName + ", " + TEMP_DATA.sPatientFirstName + sTab + TEMP_DATA.sPatientID + sTab         'get
   name and ID
      sTemp = sTemp + Format$(TEMP_DATA.dEventDate(1), "Short Date") + sTab         'get first dose date
      sTemp = sTemp + Format$(TEMP_DATA.dEventDate(TEMP_DATA.lEventData(0)), "Short Date")         'get last dose date
      sTemp = sTemp + sTab + Format$(CStr(dCompliance), "#0")         'get compliance
      If cmboDataToView.ListIndex <> 2 Then sTemp = sTemp + " %"

      grid.AddItem sTemp
```

```
        grid.RowData(i) = i - 1
        If i >= UBound(xsPatientFileSpecs) Then ReDim Preserve xsPatientFileSpecs(i + 10)

        xsPatientFileSpecs(i - 1) = sFileSpec        'keep the name of the file here for when user clicks on cell
        sFileName = LCase$(Dir)                       'get next file (one by one)
        grid.Redraw = True
    Loop                                'process next filename

    grid.Redraw = True

  CalculateAllPatientsComplianceOnDisk_Exit:
    Me.MousePointer = vbDefault
    Exit Sub

  CalculateAllPatientsComplianceOnDisk_error:
'    Resume 0   'testing only
    Resume CalculateAllPatientsComplianceOnDisk_Exit
  End Sub
```

```
Private Sub Form_Load()
   frmMain.MousePointer = vbHourglass
   DoEvents

   xbAllPatientsFormLoading = True
   ReDim xsPatientFileSpecs(2)
   If cmboDateSelection.ListIndex < 0 Then cmboDateSelection.ListIndex = 2            'set a default

   cmboDataToView.ListIndex = 0

   xbAllPatientsFormLoading = False
   CalculateAllPatientsComplianceOnDisk
   grid.Col = 0
   grid.Sort = 1   'generic ascending
   frmMain.MousePointer = vbDefault
   RefreshAllOpenForms

End Sub
```

```
Private Sub Form_Resize()
   Dim lWidthRemaining As Integer
   Static bProcedureInProgress As Boolean
   If bProcedureInProgress Then Exit Sub
   If Me.WindowState = vbMinimized Then Exit Sub
   bProcedureInProgress = True

   If Me.Width < 5000 Then
      Me.Width = 5000
      bProcedureInProgress = False
   End If

   If Me.Height < 5000 Then
      Me.Height = 5000
      bProcedureInProgress = False
   End If

   SSPanel1.Left = Me.Width - SSPanel1.Width - 100
   grid.Width = SSPanel1.Left - grid.Left - 150
   grid.Height = Me.Height - grid.Top - 425

   grid.ColWidth(4) = 625                  'Score
   grid.ColWidth(0) = (grid.Width - grid.ColWidth(4)) / (grid.Cols - 1)          'Name
   grid.ColWidth(1) = grid.ColWidth(0)          'ID
   lWidthRemaining = grid.Width - grid.ColWidth(0) - grid.ColWidth(1) - grid.ColWidth(4) - 120
   grid.ColWidth(2) = lWidthRemaining / 2          'Start Date
   grid.ColWidth(3) = grid.ColWidth(2)          'Last Dose Date
```

```
    bProcedureInProgress = False

  End Sub
```

```
  Private Sub grid_Click()

    Dim iRow As Integer

    'Find out which column was clicked
    'Sort the array only if the header was clicked

    If grid.Rows < 2 Then Exit Sub

    iRow = grid.MouseRow
    If iRow = 0 Then
      grid.Col = grid.MouseCol
      grid.Sort = 1   'generic ascending
      Exit Sub
    End If

  End Sub
```

```
  Private Sub grid_DblClick()
    Dim sFileName As String, r As Integer, iRow As Integer
    If grid.Rows < 2 Then Exit Sub

    iRow = grid.MouseRow
    sFileName = xsPatientFileSpecs(grid.RowData(iRow))

    'open the document that was double-clicked
    r = OpenPatientData(sFileName)
  End Sub
```

```
  Private Sub Slider1_SlideChange()
    Dim i As Integer, j As Integer

    Label1(0).Caption = "Compliance Threshold =< " + CStr(Slider1.Value) + "%"
    grid.Redraw = False

    For i = 1 To grid.Rows - 1
      'If gtAllPatients.sScore(grid.RowData(i)) < Slider1.Value Then
      grid.Row = i
      grid.Col = 4
      If grid.Value < Slider1.Value Then
        For j = 0 To grid.Cols - 1
          grid.Col = j
          grid.CellBackColor = &HC0FFFF     '&HC0C0FF
        Next j
      Else
        For j = 0 To grid.Cols - 1
          grid.Col = j
          grid.CellBackColor = 0
        Next j
      End If
    Next i

    grid.Row = 0
    grid.Col = 0
    grid.Redraw = True
  End Sub
```

```
Private Sub txtEndDate_HideDropDown()
    DoEvents
    gsLastEndDateChosen = txtEndDate
    cmboDateSelection.ListIndex = 5          'select the custom setting
    CalculateAllPatientsComplianceOnDisk
    Slider1_SlideChange
End Sub
```

```
Private Sub txtStartDate_HideDropDown()
    DoEvents
    gsLastStartDateChosen = txtStartDate
    cmboDateSelection.ListIndex = 5          'select the custom setting
    CalculateAllPatientsComplianceOnDisk
    Slider1_SlideChange
End Sub
```

frmRecentDosingGraph.frm - File Declaratl(

```
Attribute VB_Name = "frmPatientSummary"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
```

```
Public Sub UpDatefrmPatientSummaryHeader()
  Dim DataStruct As DeviceDataStruct
  DataStruct = PAT_DATA

  txtPatientLastName = " " + DataStruct.sPatientLastName
  txtPatientFirstName = " " + DataStruct.sPatientFirstName
  txtPatientID = " " + DataStruct.sPatientID
  txtDrug = " " + DataStruct.sDrug
  txtTxCenter = " " + DataStruct.sTxCenter
  txtOrgan = " " + DataStruct.sOrgan
  If DataStruct.dLastDownloadDate Then
    txtRetrievalDate = " " + Format$(DataStruct.dLastDownloadDate, gsDateDisplayFormat)
  Else
    txtRetrievalDate = " "
  End If
  txtSerialNumber = " " + DataStruct.sSerialNumber
  MSChart1.Visible = True

  If cmboDateSelection.ListIndex < 0 Then cmboDateSelection.ListIndex = 1          'pick a default range
  'txtStartDate = Format$(CDate(DataStruct.dEventDate(1)), gsDateDisplayFormat)
  'txtEndDate = Format$(CDate(DataStruct.dEventDate(DataStruct.iEventData(0))), gsDateDisplayFormat)
  Me.Refresh

End Sub
```

```
Public Sub UpdatePatientDosingGraph()
  'Update the graph due to a check box being changed.
  Dim sTab As String, l As Long
  Dim lDateBegin As Long, lDateEnd As Long, lScoreSum As Long
  Dim iPlotValue As Integer     'keeps a tally of the value to be plotted for each day
  Dim dPlotDate As Double, iDayEventsFound As Integer, iDateIndex As Integer

  Me.MousePointer = vbHourglass
  DoEvents

  If IsDate(txtStartDate) Then
    lDateBegin = Int(CDate(txtStartDate))
  Else
    lDateBegin = Int(PAT_DATA.dEventDate(1))
  End If

  If IsDate(txtEndDate) Then
    lDateEnd = Int(CDate(txtEndDate))
  Else
    lDateEnd = Int(PAT_DATA.dEventDate(PAT_DATA.iEventData(0)))
  End If

  MSChart1.RowCount = 0
  dPlotDate = Int(PAT_DATA.dEventDate(1))     'get the first event date
  If lDateBegin Then                          'there is at least a value in there
    Select Case cmboDataToView.ListIndex
      Case 0      'Doses per day score  (all doses on this day regardless of time taken
        For l = lDateBegin To lDateEnd              'the number of events is stored here
          iPlotValue = CalcDayDoseScore_AllDoses(PAT_DATA, l)
          MSChart1.RowCount = MSChart1.RowCount + 1          'increment the row count
          MSChart1.Row = MSChart1.RowCount             'plot in last row
          MSChart1.Data = iPlotValue
          lScoreSum = lScoreSum + iPlotValue
```

```
            Next I
            'MSChart1.Plot.Axis(VtChAxisIdY).AxisScale.Type = VtChScaleTypePercent * 100     'set scale to percent
            'MSChart1.Plot.Axis(VtChAxisIdY).AxisScale.PercentBasis = VtChPercentAxisBasisMaxChart
            MSChart1.Plot.Axis(VtChAxisIdY).AxisScale.Type = VtChScaleTypeLinear
            MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.Auto = False
            MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.Maximum = 100
            MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.MajorDivision = 10
            MSChart1.TitleText = " Doses/Day Score (regardless of prescribed time)"
            MSChart1.Plot.Axis(VtChAxisIdY).AxisTitle.Text = "Percent"
            txtScore = Format$(CStr(lScoreSum / (lDateEnd - lDateBegin + 1)), " ##") + " %"     'put the most recent score in the text box

        Case 1      'Compliance Doses per day (on time doses per day)
            For I = lDateBegin To lDateEnd          'the number of events is stored here
                iPlotValue = CalcDayDoseScore_OnTime(PAT_DATA, I)
                MSChart1.RowCount = MSChart1.RowCount + 1           'increment the row count
                MSChart1.Row = MSChart1.RowCount                    'plot in last row
                MSChart1.Data = iPlotValue
                lScoreSum = lScoreSum + iPlotValue
            Next I
            MSChart1.Plot.Axis(VtChAxisIdY).AxisScale.Type = VtChScaleTypeLinear
            MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.Auto = False
            MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.Maximum = 100
            MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.MajorDivision = 10
            MSChart1.TitleText = "On-Time Doses/Day Score (within prescribed time)"
            MSChart1.Plot.Axis(VtChAxisIdY).AxisTitle.Text = "Percent"
            txtScore = Format$(CStr(lScoreSum / (lDateEnd - lDateBegin + 1)), " ##") + " %"     'put the most recent score in the text box

        Case 2      'Doses Taken per day
            For I = lDateBegin To lDateEnd                  'the number of events is stored here
                iPlotValue = CalcDosesSumTakenOnSpecificDay(PAT_DATA, I)
                MSChart1.RowCount = MSChart1.RowCount + 1           'increment the row count
                MSChart1.Row = MSChart1.RowCount                    'plot in last row
                MSChart1.Data = iPlotValue
            Next I
                MSChart1.Plot.Axis(VtChAxisIdY).AxisScale.Type = VtChScaleTypeLinear
                MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.Auto = False
                MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.Maximum = 10     'client wants to hard code this at 10
                MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.MajorDivision = 10
                MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.MinorDivision = 1
                MSChart1.TitleText = "        Total Doses Taken Per Day"
                MSChart1.Plot.Axis(VtChAxisIdY).AxisTitle.Text = "Doses"
                txtScore = ""   'no score appears for doses sum

        Case 3      'Doses Missed
        'note. this section is not used currently. Client decided to remove it from the display
        For I = lDateBegin To lDateEnd                  'the number of events is stored here
            iPlotValue = PAT_DATA.iDosesPerDay - CalcDosesSumTakenOnSpecificDay(PAT_DATA, I)
            MSChart1.RowCount = MSChart1.RowCount + 1           'increment the row count
            MSChart1.Row = MSChart1.RowCount                    'plot in last row
            MSChart1.Data = iPlotValue
        Next I
        MSChart1.Plot.Axis(VtChAxisIdY).AxisScale.Type = VtChScaleTypeLinear
        MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.Auto = False
        MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.Maximum = 10     'client wants to hard code this at 10
        MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.MajorDivision = 10
        MSChart1.Plot.Axis(VtChAxisIdY).ValueScale.MinorDivision = 1
        'MSChart1.Plot.Axis(VtChAxisIdY).AxisScale.Hide = False
        MSChart1.TitleText = "      Doses Missed Per Day"
        MSChart1.Plot.Axis(VtChAxisIdY).AxisTitle.Text = "Doses"
        txtScore = ""   'no score appears for doses missed
    End Select
  End If

  'MSChart1.xaxisside = "test"
  Me.MousePointer = vbDefault

End Sub
```

```
Private Sub btnClose_Click()
   Unload Me
End Sub

Private Sub cmboAverageDays_Click()
   UpdatePatientDosingGraph
End Sub

Private Sub cmboChartType_Click()
   Select Case cmboChartType.Text
     Case "Line"
       MSChart1.chartType = VtChChartType2dLine

     Case "Area"
       MSChart1.chartType = VtChChartType2dArea

     Case "Bar"
       MSChart1.chartType = VtChChartType2dCombination

     Case "Step"
       MSChart1.chartType = VtChChartType2dStep

   End Select
End Sub

Private Sub cmboDataToView_Click()
   UpdatePatientDosingGraph
End Sub

Public Sub cmboDateSelection_Click()

   If PAT_DATA.iEventData(0) = 0 Then    'no data appears to be loaded
     txtStartDate = CVDate(Now)
     txtEndDate = CVDate(Now)
     Exit Sub
   End If

   Select Case cmboDateSelection.ListIndex
     Case 0      'recent 7 days
       txtEndDate = CDate(Int(PAT_DATA.dEventDate(PAT_DATA.iEventData(0))))
       txtStartDate = CDate(Int(PAT_DATA.dEventDate(PAT_DATA.iEventData(0))) - 7)

     Case 1      'recent 14 days
       txtEndDate = CDate(Int(PAT_DATA.dEventDate(PAT_DATA.iEventData(0))))
       txtStartDate = CDate(Int(PAT_DATA.dEventDate(PAT_DATA.iEventData(0))) - 14)

     Case 2      'recent 30 days
       txtEndDate = CDate(Int(PAT_DATA.dEventDate(PAT_DATA.iEventData(0))))
       txtStartDate = CDate(Int(PAT_DATA.dEventDate(PAT_DATA.iEventData(0))) - 30)

     Case 3      'recent 6 months
       txtEndDate = CDate(Int(PAT_DATA.dEventDate(PAT_DATA.iEventData(0))))
       txtStartDate = CDate(Int(PAT_DATA.dEventDate(PAT_DATA.iEventData(0))) - 180)
```

```
    End If

    pnlControls.Left = Me.Width - pnlControls.Width - 200
    pnlChart.Width = pnlControls.Left - 100
    MSChart1.Width = pnlChart.Width - 100
    pnlChart.Height = Me.Height - pnlChart.Top - 500
    MSChart1.Height = pnlChart.Height - 100

    bProcedureInProgress = False

End Sub
```

```
Private Sub Form_Unload(Cancel As Integer)
  'Save last settings selected by user
  PAT_SUM_DEFAULTS.cmboDataToView = cmboDataToView.ListIndex
  PAT_SUM_DEFAULTS.cmboChartType = cmboChartType.ListIndex
End Sub
```

```
Private Sub txtEndDate_Change()
  DoEvents
  gsLastEndDateChosen = txtEndDate
  'In case the user chose a date far removed from the date of the first
  'dose, then notify the user and set the date to the first dose.
  If DateValue(gsLastEndDateChosen) > Int(PAT_DATA.dEventDate(PAT_DATA.iEventData(0))) Then
    MsgBox "The ending date you chose is later than the last dose taken by this patient.  The starting date is being set to the first dose.",
     vbInformation, "Ending Date Too Late"
    txtEndDate = CDate(PAT_DATA.dEventDate(PAT_DATA.iEventData(0)))
    gsLastEndDateChosen = txtEndDate
  End If

  cmboDateSelection.ListIndex = 5        'select the user setting
  UpdatePatientDosingGraph
End Sub
```

```
Private Sub txtStartDate_Change()
  DoEvents
  gsLastStartDateChosen = txtStartDate
  'In case the user chose a date far removed from the date of the last
  'dose, then notify the user and set the date to the last dose.
  If DateValue(gsLastStartDateChosen) < Int(PAT_DATA.dEventDate(1)) Then
    MsgBox "The starting date you chose is sooner than the first dose taken by this patient.  The starting date is being set to the first dose
     .", vbInformation, "Start Date Too Early"
    txtStartDate = CDate(PAT_DATA.dEventDate(1))
    gsLastStartDateChosen = txtStartDate
  End If

  cmboDateSelection.ListIndex = 5        'select the user setting
  UpdatePatientDosingGraph
End Sub
```

frmDosingCalendar.frm - File Declarations

```
Attribute VB_Name = "frmDosingCalendar"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit

Private bgResizedCalendar As Boolean
```

```
Private Sub btnChangeCompliance_Click()
  glLatestOptionsTabSelected = 1        'display the proper tab once the dialog is opened
  frmOptions.Show vbModal

End Sub
```

```
Private Sub btnClose_Click()
  Unload Me
End Sub
```

```
Private Sub Calendar_DayChange()
  Static bProcedureInProgress As Boolean

  If bProcedureInProgress Then Exit Sub     'prevent recursive calls
  bProcedureInProgress = True
  frmDosingCalendar.MousePointer = vbHourglass          'hour glass
  DoEvents
  UpdateZoomBox
  frmDosingCalendar.MousePointer = vbDefault          'default glass
  bProcedureInProgress = False          'allow another call to this sub

End Sub
```

```
Private Sub Calendar_MonthChange()
  Static bProcedureInProgress

  If bProcedureInProgress Then Exit Sub     'prevent recursive calls
  bProcedureInProgress = True
  frmDosingCalender.MousePointer = vbHourglass          'hour glass
  DoEvents
  UpdateCalendar
  frmDosingCalendar.MousePointer = vbDefault          'default
  bProcedureInProgress = False

End Sub
```

```
Private Sub Calendar_MouseMove(Button As Integer, Shift As Integer, X As Single, Y As Single)
    If bgResizedCalendar Then
        UpdateCalendar
        bgResizedCalendar = False
    End If

End Sub
```

```
Private Sub Calendar_YearChange()
    Calendar_MonthChange

End Sub
```

```
Private Sub chkDoseChanged_Click()
    DrawAllDoseSizeChanges
    UpdateZoomBox
End Sub
```

```
Private Sub chkDosesMissed_Click()
    DrawAllDosesMissed
    UpdateZoomBox
End Sub
```

```
Private Sub chkDosesNotComplied_Click()
    DrawAllNonCompliedDosesTaken
    UpdateZoomBox

End Sub
```

```
Private Sub chkDosesTaken_Click()
    DrawAllCompliedDosesTaken
    UpdateZoomBox
End Sub
```

```
Private Sub chkWeekNumbers_Click()
    RemoveAllObjects
    frmDosingCalendar.Calendar.WeekNumbers = chkWeekNumbers
    DoEvents
    UpdateCalendar

End Sub
```

```
Private Sub Form_Activate()
   SetPrinterIcon False, ""
End Sub
```

```
Private Sub Form_Load()
   Dim i As Integer
   'start calendar with date of latest dose
   If PAT_DATA.dEventDate(PAT_DATA.iEventData(0)) > 0 Then
      frmDosingCalendar.Calendar.Date = CVDate(PAT_DATA.dEventDate(PAT_DATA.iEventData(0)))
   Else
      frmDosingCalendar.Calendar.Date = Now
   End If
   Me.Show

   Load lblDetailTime(2)
   Load lblDetailTime(4)
   Load lblDetailTime(6)
   Load lblDetailTime(8)
   Load lblDetailTime(10)
   Load lblDetailTime(12)
   Load lblDetailTime(14)
   Load lblDetailTime(16)
   Load lblDetailTime(18)
   Load lblDetailTime(20)
   Load lblDetailTime(22)
   CreateCalendarTimeScale
   DoEvents
   frmDosingCalendar.Calendar.MouseExpand = 5        'expand the hot spot around date arrows
   Me.Show

   'Set the dialog controls to the settings last set by user
   chkDosesMissed = CAL_DEFAULTS.chkDosesMissed
   chkDosesNotComplied = CAL_DEFAULTS.chkDosesNotComplied
   chkDosesTaken = CAL_DEFAULTS.chkDosesTaken
   chkDoseChanged = CAL_DEFAULTS.chkDoseChanged

   UpdateCalendar
End Sub
```

```
Private Sub CreateCalendarTimeScale()
   On Error Resume Next
   'Create the time scale on detail area
   Dim sAM As String, sPM As String, I As Integer

   If frmDosingCalendar.Width < 5000 Then
      sAM = ""
      sPM = ""
   Else
      sAM = "am"
      sPM = "pm"
   End If

   lblDetailTime(2).Caption = "2" + sAM
   With lblDetailTime(2)
      .Left = (Me.pnlZoom.Width * (I / 24)) - (Me.lblDetailTime(I).Width / 2)
      .ForeColor = &HFFFFFF
      .Visible = True
      .ZOrder
   End With

   lblDetailTime(4).Caption = "4" + sAM
   With lblDetailTime(4)
      .Left = (Me.pnlZoom.Width * (I / 24)) - (Me.lblDetailTime(I).Width / 2)
      .ForeColor = &HFFFFFF
      .Visible = True
```

```
        .ZOrder
    End With

    lblDetailTime(6).Caption = "6" + sAM
    With lblDetailTime(6)
        .Left = (Me.pnlZoom.Width * (I / 24)) - (Me.lblDetailTime(i).Width / 2)
        .ForeColor = &HFFFFFF
        .Visible = True
        .ZOrder
    End With

    lblDetailTime(8).Caption = "8" + sAM
    With lblDetailTime(8)
        .Left = (Me.pnlZoom.Width * (i / 24)) - (Me.lblDetailTime(i).Width / 2)
        .ForeColor = &HFFFFFF
        .Visible = True
        .ZOrder
    End With

    lblDetailTime(10).Caption = "10" + sAM
    With lblDetailTime(10)
        .Left = (Me.pnlZoom.Width * (I / 24)) - (Me.lblDetailTime(i).Width / 2)
        .ForeColor = &HFFFFFF
        .Visible = True
        .ZOrder
    End With

    lblDetailTime(12).Caption = "12" + sPM
    With lblDetailTime(12)
        .Left = (Me.pnlZoom.Width * (I / 24)) - (Me.lblDetailTime(I).Width / 2)
        .ForeColor = &HFFFFFF
        .Visible = True
        .ZOrder
    End With

    lblDetailTime(14).Caption = "2" + sPM
    With lblDetailTime(14)
        .Left = (Me.pnlZoom.Width * (I / 24)) - (Me.lblDetailTime(I).Width / 2)
        .ForeColor = &HFFFFFF
        .Visible = True
        .ZOrder
    End With

    lblDetailTime(16).Caption = "4" + sPM
    With lblDetailTime(16)
        .Left = (Me.pnlZoom.Width * (I / 24)) - (Me.lblDetailTime(I).Width / 2)
        .ForeColor = &HFFFFFF
        .Visible = True
        .ZOrder
    End With

    lblDetailTime(18).Caption = "6" + sPM
    With lblDetailTime(18)
        .Left = (Me.pnlZoom.Width * (I / 24)) - (Me.lblDetailTime(I).Width / 2)
        .ForeColor = &HFFFFFF
        .Visible = True
        .ZOrder
    End With

    lblDetailTime(20).Caption = "8" + sPM
    With lblDetailTime(20)
        .Left = (Me.pnlZoom.Width * (I / 24)) - (Me.lblDetailTime(I).Width / 2)
        .ForeColor = &HFFFFFF
        .Visible = True
        .ZOrder
    End With
    lblDetailTime(22).Caption = "10" + sPM
    With lblDetailTime(22)
      .Left = (Me.pnlZoom.Width * (i / 24)) - (Me.lblDetailTime(i).Width / 2)
      .ForeColor = &HFFFFFF
      .Visible = True
      .ZOrder
    End With

    On Error GoTo 0
End Sub
```

```
Private Sub Form_MouseMove(Button As Integer, Shift As Integer, X As Single, Y As Single)
    If bgResizedCalendar Then
      UpdateCalendar
      bgResizedCalendar = False
    End If
End Sub
```

```
Private Sub Form_Resize()
    Me.Refresh
    Static bProcedureInProgress As Boolean

    If bProcedureInProgress Then Exit Sub
    If Me.WindowState = vbMinimized Then Exit Sub

    bProcedureInProgress = True

    If Me.Width < 6000 Then
      Me.Width = 6000
      bProcedureInProgress = False
    End If

    If Me.Height < 5000 Then
      Me.Height = 5000
      bProcedureInProgress = False
    End If

'   DeleteAllObjects

    CreateCalendarTimeScale
    pnlControls.Left = Me.Width - pnlControls.Width - 200
    Calendar.Width = pnlControls.Left - Calendar.Left - 150

    pnlZoom.Top = Me.Height - pnlZoom.Height - 450
'   pnlTime.Top = pnlZoom.Top

    Calendar.Height = pnlZoom.Top - Calendar.Top - 100
    bgResizedCalendar = True       'med events on form can not be updated until resize is done
    pnlZoom.Width = Calendar.Width

    bProcedureInProgress = False
End Sub
```

```
Private Sub Form_Unload(Cancel As Integer)
   CAL_DEFAULTS.chkDosesMissed = chkDosesMissed
   CAL_DEFAULTS.chkDosesNotComplied = chkDosesNotComplied
   CAL_DEFAULTS.chkDosesTaken = chkDosesTaken
   CAL_DEFAULTS.chkDoseChanged = chkDoseChanged
End Sub
```

```
Private Sub frameView_MouseMove(Button As Integer, Shift As Integer, X As Single, Y As Single)
   If bgResizedCalendar Then
      UpdateCalendar
      bgResizedCalendar = False
   End If
End Sub
```

```
Private Sub pnlControls_MouseMove(Button As Integer, Shift As Integer, X As Single, Y As Single)
   If bgResizedCalendar Then
      UpdateCalendar
      bgResizedCalendar = False
   End If
End Sub
```

```
Attribute VB_Name = "frmPatientDosingReport"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
```

```
Private Sub RescaleGrid()
  Dim iRemainder As Integer
  'put any fixed width columns first
  grid.ColWidth(6) = 0          'don't show this column
  grid.ColWidth(1) = 1300
  grid.ColWidth(2) = 900
  grid.ColWidth(3) = 1000
  grid.ColWidth(4) = 950

  iRemainder = grid.Width - grid.ColWidth(4) - grid.ColWidth(3) - grid.ColWidth(2) - grid.ColWidth(1)
  grid.ColWidth(0) = iRemainder * 0.25
  grid.ColWidth(5) = iRemainder * 0.75 - 370

End Sub
```

```
Public Sub UpdatefrmPatientDosingReportHeader()
  'Show custom labels from config file if there were any
  Label1(3) = gsCustomLblPatientLastName
  Label1(1) = gsCustomLblPatientFirstName
  Label1(2) = gsCustomLblOrgan
  Label1(0) = gsCustomLblPatientID
  Label1(6) = gsCustomLblTxCenter
  Label1(7) = gsCustomLblDrug

  txtPatientLastName = " " + PAT_DATA.sPatientLastName
  txtPatientFirstName = " " + PAT_DATA.sPatientFirstName
  txtPatientID = " " + PAT_DATA.sPatientID
  txtDrug = " " + PAT_DATA.sDrug
  txtTxCenter = " " + PAT_DATA.sTxCenter
  txtOrgan = " " + PAT_DATA.sOrgan

End Sub
```

```
Public Sub UpdatePatientGridDisplay()
  'This proc is called when it is necessary to update the display
  'due to some element or feature being changed.

  Dim sTab As String, i As Integer, sTime As String, sDate As String, sTemp As String


  Dim bShowDosesTaken As Boolean, bShowDoseChanges As Boolean, bShowUserEvents As Boolean
  sTab = Chr$(9)
  grid.Clear        'the erase the grid
  grid.Rows = 1
  grid.FormatString = "<Date & Time    | Event Type | Dose Size  |" + gsLabelGridColumnCustom1 + "   |" + gsLabelGridColumnCustom2
   + "   |" + gsLabelGridColumnCustom3

  RescaleGrid
  'grid.Row = 0
  grid.Col = 1       'set to column 1
  grid.Redraw = False

  bShowDosesTaken = chkDoses.Value          'speed up the display in loop by assigning control value to a var
  bShowDoseChanges = chkDoseChanged.Value
  bShowUserEvents = chkUserDefined.Value
```

frmPatientDosingRpt.frm - UpdatePatientGridDi.

```
For i = 1 To CInt(PAT_DATA.iEventData(0))          'the number of events is stored here
    If PAT_DATA.byteEventType(i) = giEVENT_DOSE_TAKEN Then
        If bShowDosesTaken Then
            sTemp = Format$(PAT_DATA.dEventDate(i), gsDateDisplayFormat) + " " + Format$(PAT_DATA.dEventDate(i),
            gsTimeDisplayFormat)
            sTemp = sTemp + sTab + "Dose Taken" + sTab + CStr(PAT_DATA.iEventData(i)) + " mg"
            sTemp = sTemp + sTab + PAT_DATA.sUserData1(i) + sTab + PAT_DATA.sUserData2(i) + sTab + PAT_DATA.sUserData3(i)
            grid.AddItem sTemp
'xxx            grid.ListApplyTo = 12 'LC_LISTAPPLYTO_SINGLE_ITEM
'xxx            grid.ForeColor = &H0     'black
            grid.RowData(grid.Rows - 1) = CStr(i)
        End If

    ElseIf PAT_DATA.byteEventType(i) = giEVENT_DOSE_CHANGED Then
        If bShowDoseChanges Then
            sTemp = Format$(PAT_DATA.dEventDate(i), gsDateDisplayFormat) + " " + Format$(PAT_DATA.dEventDate(i),
            gsTimeDisplayFormat)
            sTemp = sTemp + sTab + "Dose Change" + sTab + CStr(PAT_DATA.iEventData(i)) + " mg"
            sTemp = sTemp + sTab + PAT_DATA.sUserData1(i) + sTab + PAT_DATA.sUserData2(i) + sTab + PAT_DATA.sUserData3(i)
            grid.AddItem sTemp
'xxx            grid.ListApplyTo = 12 'LC_LISTAPPLYTO_SINGLE_ITEM
'xxx            grid.ForeColor = &HC0FFFF    'yellow
            grid.RowData(grid.Rows - 1) = i
        End If

    ElseIf PAT_DATA.byteEventType(i) = giEVENT_USER_DEFINED Then
        If bShowUserEvents Then
            sTemp = Format$(PAT_DATA.dEventDate(i), gsDateDisplayFormat) + " " + Format$(PAT_DATA.dEventDate(i),
            gsTimeDisplayFormat)
            sTemp = sTemp + sTab + "Custom Event" + sTab        'no doses data to be saved with custom events + sTab + CStr(PAT_DATA.
            iEventData(i)) + " mg"
            sTemp = sTemp + sTab + PAT_DATA.sUserData1(i) + sTab + PAT_DATA.sUserData2(i) + sTab + PAT_DATA.sUserData3(i)
            grid.AddItem sTemp
'xxx            grid.ListApplyTo = 12 'LC_LISTAPPLYTO_SINGLE_ITEM
'xxx            grid.ForeColor = &HC0FFFF    'yellow
            grid.RowData(grid.Rows - 1) = i
        End If
    End If
Next i
grid.Redraw = True
grid.Row = 0
grid.Col = 0
btnDeleteUserEvent.Enabled = False

End Sub
```

```
Private Sub btnClose_Click()
    Unload Me
End Sub
```

```
Private Sub btnDeleteUserEvent_Click()
  Dim r As Integer, iIndex As Integer, sMSG As String

  sMSG = "The selected event will be permanently removed from the file." + vbCrLf + vbCrLf + "Do you want to delete the event?"
  r = MsgBox(sMSG, vbYesNo + vbQuestion, "Verify Event Deletion")
  If r = vbYes Then
    iIndex = CInt(grid.RowData(grid.Row))
    If PAT_DATA.byteEventType(iIndex) = giEVENT_USER_DEFINED Then EventDelete PAT_DATA, iIndex                'delete this
     event
    Call UpdatePatientGridDisplay
  End If
End Sub
```

```
Private Sub btnNewUserEvent_Click()
  'Add an event to the grid for a time and date defined by the user
  Dim iIndex As Integer, lDate As Long, i As Integer

  frmGetDateTime.Show vbModal      'Get the date of event from user
  If gdTempDateTime Then           'don't add a date if user cancelled out of entry dialog
    'Find the date in the structure
    iIndex = FindClosestDateInArray(PAT_DATA, gdTempDateTime)
    EventInsert PAT_DATA, iIndex, gdTempDateTime        'insert a new custom event
    If chkUserDefined.Value = 0 Then
      chkUserDefined.Value = vbChecked
    Else
      Call UpdatePatientGridDisplay
    End If
    grid.SetFocus
    grid.Col = 3

    For i = 1 To grid.Rows - 1
      If grid.RowData(i) = iIndex Then     'this is the index we just added
        grid.Row = i                 'highlight this row
        grid.TopRow = i
      End If
    Next i

  End If
End Sub
```

```
Private Sub chkDoseChanged_Click()
  Call UpdatePatientGridDisplay
End Sub
```

```
Private Sub chkDoses_Click()
  Call UpdatePatientGridDisplay
End Sub
```

```
Private Sub chkUserDefined_Click()
   Call UpdatePatientGridDisplay
End Sub
```

```
Private Sub Form_Activate()
   Me.Refresh
   Form_Resize
   grid.Refresh
   Call UpdatePatientGridDisplay
   SetPrinterIcon True, "&Print Dosing Report..."
End Sub
```

```
Private Sub Form_Load()
   UpdatefrmPatientDosingReportHeader
End Sub
```

```
Private Sub Form_Resize()
   Static bProcedureInProgress As Boolean
   If bProcedureInProgress Then Exit Sub
   If Me.WindowState = vbMinimized Then Exit Sub
   bProcedureInProgress = True

   If Me.Width < 8100 Then
      Me.Width = 8100
      bProcedureInProgress = False
   End If

   If Me.Height < 5000 Then
      Me.Height = 5000
      bProcedureInProgress = False
   End If

   frameView.Left = Me.Width - frameView.Width - 250
   btnClose.Left = Me.Width - btnClose.Width - 250

   grid.Width = btnClose.Left + btnClose.Width - grid.Left
   grid.Height = Me.Height - grid.Top - 425
   RescaleGrid

   bProcedureInProgress = False
End Sub
```

```
Private Sub grid_AfterEdit(ByVal Row As Long, ByVal Col As Long)
   Dim lIndex As Integer
   Select Case Col
      Case 3        'user column 1
         PAT_DATA.sUserData1(grid.RowData(Row)) = grid.Text      'put the change into the structure
      Case 4        'user column 2
         PAT_DATA.sUserData2(grid.RowData(Row)) = grid.Text      'put the change into the structure
      Case 5        'user column 3
         PAT_DATA.sUserData3(grid.RowData(Row)) = grid.Text      'put the change into the structure
   End Select
   gbPatientDataNotSaved = True     'set flag to indicate that the file has changed but not yet been saved

   If grid.Col = 3 Then
      grid.Col = 4      'go to next cell

   ElseIf grid.Col = 4 Then
      grid.Col = 5      'go to next cell
```

```
    ElseIf grid.Col = 5 Then
        If grid.Rows > grid.Row + 1 Then        'prevent run time error by looking for last row
            grid.Row = grid.Row + 1
            grid.Col = 3   'go to next cell
        End If
    End If
End Sub
```

```
Private Sub grid_KeyDown(KeyCode As Integer, Shift As Integer)
    If KeyCode = 46 And grid.Col > 4 Then
        'delete key was pressed and column is editable
        grid.Text = ""
        gbPatientDataNotSaved = True      'set flag to indicate that the file has changed but not yet been saved
        grid_AfterEdit grid.Row, grid.Col
    End If
End Sub
```

```
Private Sub grid_RowColChange()
    Dim iIndex As Integer

    If grid.Col > 4 Then    'allow cell to be edited if it is a custom column
        grid.Editable = True
    Else
        grid.Editable = False
    End If

    iIndex = CInt(grid.RowData(grid.Row))
    If PAT_DATA.byteEventType(iIndex) = giEVENT_USER_DEFINED Then
        btnDeleteUserEvent.Enabled = True
    Else
        btnDeleteUserEvent.Enabled = False
    End If

End Sub
```

```
Attribute VB_Name = "frmReadDeviceData"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
```

```
Private Sub btnClose_Click()
   Unload Me
End Sub
```

```
Private Sub btnReadEntireContents_Click()
   Dim r As Integer, lErrorCode As Long, i As Integer, sMSG As String

   r = ValidatePatientDataSaved   'ensure that previous patient data was saved before proceeding
   If r = vbCancel Then Exit Sub

   btnReadEntireContents.Enabled = False      'prevent recursive calls to device
   gbKeepPollingDevice = False                'stop polling for now
   Wait 0.25

   txtPatientLastName = ""          'clear out the text boxes before reading data
   txtPatientFirstName = ""         'clear out the text boxes before reading data
   txtDrug = ""
   txtPatientID = ""
   txtTxCenter = ""
   txtOrgan = ""
   txtSerialNumber = ""
   txtDoseSize = ""
   txtDoseTime(1) = ""
   txtDoseTime(2) = ""
   txtDoseTime(3) = ""
   txtDoseTime(4) = ""
   txtDosesPerDay = ""
   txtDoseLockoutHours = ""
   txtMedicationRemaining = ""
   txtEventCount = ""
   txtLastRetrievalDate = ""
   txtDeviceStarted = ""

   r = Comm_ReadEntireMemoryContents(PAT_DATA, lErrorCode)
   If r Then
      PopulateDeviceCommDialog PAT_DATA, Me
      PAT_DATA.sPatientDataFileName = ""
      frmMain.mnuFileSave.Enabled = False
   Else
      EraseDataInMemory PAT_DATA
      DisplayErrorMessage lErrorCode
   End If

   btnReadEntireContents.Enabled = True      're-enable button
   RefreshAllOpenForms

   'Compare battery time to value retrieved from ini file to determine if a
   'reminder should be given to the user to change the batteries.
   i = CInt(GetINISetting(gsAppIniFileSpec, "Options", "Battery Change Days", 180))
   If i And Val(PAT_DATA.sBatteryChangeTimer) >= i Then
      sMSG = "The battery in this device needs to be changed." + vbCrLf + vbCrLf

      'Also look at the error flag returned from the device to see if the brownout
      'bit was set. If so, append a different notice to the message than the normal one.

      If PAT_DATA.bErrorBrownOut Then
         sMSG = sMSG + "The device indicates that power was briefly lost due to low voltage."
      Else
         sMSG = sMSG + "They have been in place for over " + CStr(i / 30) + " months."
```

```
        End If

        sMSG = sMSG + vbCrLf + vbCrLf + "Do you want to change the battery now?"
        Beep
        r = MsgBox(sMSG, vbExclamation + vbYesNo + vbDefaultButton2, "Battery Change Needed")
        If r = vbYes Then
            Call ChangeBatteriesRequest
        End If
    End If
End Sub
```

```
Private Sub Form_Activate()
    PopulateDeviceCommDialog PAT_DATA, Me
    Comm_InitializeCommPort          'initialize the comm port from INI file settings

    gbKeepPollingDevice = True       'continue polling device
    PollDeviceContinually Me
    SetPrinterIcon False, ""
End Sub
```

```
Private Sub Form_Load()
    Me.Left = 0
    Me.Top = 0
    Unload frmDeviceInitialize    'don't need this form
    gbCommOK = 99    'reset flag that will give an indication as to the communication status.
End Sub
```

```
Private Sub Form_Unload(Cancel As Integer)
    gbKeepPollingDevice = False      'stop polling the device
    Wait 0.1
End Sub
```

frmPrint.frm - File Declarations

```
Attribute VB_Name = "frmPrint"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
```

```
Private Sub btnClose_Click()
   Unload Me
End Sub
```

```
Private Sub btnPrintNow_Click()
   btnPrintNow.Enabled = False
   btnPrintNow.Refresh
   vsPrinter1.Action = paPrintAll
   btnPrintNow.Enabled = False
End Sub
```

```
Private Sub btnPrintPage_Click()
   btnPrintPage.Enabled = False
   btnPrintPage.Refresh
   vsPrinter1.Action = paPrintPage
   btnPrintPage.Enabled = True
End Sub
```

```
Private Sub btnRefresh_Click()
   RefreshPreview
End Sub
```

```
Private Sub Form_Load()
   Dim I As Integer

   gbPrintFormLoading = True
   frmPrint.vsViewPort1.BorderStyle = 1        'turn off til needed

   gbPrinterErrorDetected = False

   Me.Width = 7500
   Me.Move (Screen.Width - Me.Width) / 2, (Screen.Height - Me.Height) / 2      'center form on screen
   datPrintingredient.DatabaseName = sgDataBaseName

   lblActivePrinter.Caption = " " + vsPrinter1.Device
   gbPreventPreviewUpdates = False        'allow controls to update when called

   Me.Show
   DoEvents
   RefreshPreview
   SetPrinterIcon False, ""
End Sub
```

```
Private Sub Form_QueryUnload(Cancel As Integer, UnloadMode As Integer)
  Dim r As Integer

  If gbPrintSpoolingInProgress Then      'user tried to exit while print spooling
    Beep
    r = MsgBox("Items are still waiting to be printed.  If you continue, the print job may be lost." + vbCrLf + vbCrLf + "Do you still want to
     close this form?", vbQuestion + vbYesNo, "Waiting For Printer")
    If r = vbNo Then Cancel = True    'prevent crash error
  End If
  gbPrintSpoolingInProgress = False
End Sub
```

```
Private Sub Form_Resize()
  If frmPrint.WindowState <> vbMinimized Then          'not minimized
    Panel3D1.Left = frmPrint.Width - Panel3D1.Width - 100
    vsViewPort1.Height = (frmPrint.Height - 400)
    vsViewPort1.Width = (Panel3D1.Left - 100)
  End If

  SetPreviewSize
End Sub
```

```
Private Sub HScroll1_Change()
  Static bProcedureActive
  If bProcedureActive Then
    HScroll1.Refresh
    Exit Sub
  End If

  bProcedureActive = True     'prevent recursive calls to this procedure
  HScroll1.Enabled = False
  frmPrint.vsPrinter1.PreviewPage = HScroll1.Value
  UpdatePageButtons
  bProcedureActive = False    'prevent recursive calls to this procedure
End Sub
```

```
Private Sub HScroll1_Scroll()
  Static bProcedureActive
  If bProcedureActive Then Exit Sub

  bProcedureActive = True     'prevent recursive calls to this procedure
  lblPageNumber = HScroll1.Value
  UpdatePageButtons
  bProcedureActive = False    'prevent recursive calls to this procedure
End Sub
```

```
Private Sub lblActivePrinter_Click()
  Static bProcedureActive
  If bProcedureActive Then Exit Sub
  bProcedureActive = True            'prevent recursive calls to this procedure

  On Error GoTo btnChangePrinter_Click_Error
  CommonDialog1.Min = 1                    'set lowest page number to print
  CommonDialog1.Max = giTotalPrintPages        'set highest page number to print
  CommonDialog1.FromPage = 1               'set lowest page number to print
  CommonDialog1.ToPage = giTotalPrintPages        'set highest page number to print

  'Set flags
    'PD_HIDEPRINTTOFILE &H100000& The Print to File check box is not displayed
    'PD_NOPAGENUMS &H8& Disables the Pages option button and the associated edit control
    'PD_PRINTSETUP &H40& Causes the system to display the Print Setup dialog box rather than the Print dialog box
  CommonDialog1.Flags = &H40&
  CommonDialog1.CancelError = True
  CommonDialog1.Action = 5              'call printer common dialog
  'Update caption to most current printer selection
  lblActivePrinter.Caption = " " + vsPrinter1.Device
  frmPrint.MousePointer = vbHourglass
  DoEvents
  SetPreviewSize         'this is mainly for layout if portrait/landscape is changed
  RefreshPreview
  frmPrint.MousePointer = vbDefault
  DoEvents

btnChangePrinter_Click_Exit:
  bProcedureActive = False        'prevent recursive calls to this procedure
  Exit Sub

btnChangePrinter_Click_Error:
  Resume btnChangePrinter_Click_Exit

End Sub
```

```
Private Sub optZoom_Click(Index As Integer)
  SetPreviewSize
End Sub
```

```
Private Sub vsPrinter1_EndPage()
  Call PrintPageNumber
End Sub
```

```
Private Sub vsPrinter1_Error()
  gbPrinterErrorReceived = True        'tells other procs that error occurred. Proc must reset flag
  If vsPrinter1.Error = 5 Then        'a cancel was received from the print options dialog
    vsPrinter1.Action = paStartDoc    'start doc
    vsPrinter1.Action = paEndDoc      'end doc

  ElseIf vsPrinter1.Error = 3 Or vsPrinter1.Error = 4 Then      'can't acces printer, or can't start job
    'an error code of 3 is generated when user presses the 'CANCEL' button from options dialog
    vsPrinter1.Action = paStartDoc        'start doc
    vsPrinter1.Action = paEndDoc          'end doc
    If gbPrinterErrorDetected = False Then        'warning has not yet been issued
      Beep
      MsgBox "The printer is not available.  Please ensure it is powered on and is on-line.", , "Can't Print"
      gbPrinterErrorDetected = True
    End If

  ElseIf vsPrinter1.Error = 6 Then    'already printing
```

```
        If gbPrinterErrorDetected = False Then      'warning has not yet been issued
        Beep
        MsgBox "The printer is not available.  Please ensure it is powered on and is on-line.", , "Can't Print"
        gbPrinterErrorDetected = True
        End If
    End If
End Sub
```

```
Private Sub vsPrinter1_NewPage()
   Dim fCurrentFontSize As Single, bCurrentFontItalic As Boolean, sCurrentFontName As String
   Dim lCurrentTextAlign As Integer, lCurrentY As Long

   With frmPrint.vsPrinter1
      fCurrentFontSize = .FontSize          'remember the existing settings, so they can be changed back
      bCurrentFontItalic = .FontItalic
      lCurrentTextAlign = .TextAlign
      lCurrentY = .CurrentY
      sCurrentFontName = .FontName

      .FontName = "Arial"
      .FontItalic = False
      .TextAlign = taRightTop
      .CurrentY = 1440 * 0.5          'print name on of program
      .FontSize = 9               'set font size
      .FontItalic = False
      frmPrint.vsPrinter1 = App.Title

      .FontSize = fCurrentFontSize
      .FontItalic = bCurrentFontItalic
      .TextAlign = lCurrentTextAlign
      .CurrentY = lCurrentY
      .FontName = sCurrentFontName
   End With

   Select Case gsActiveFormName
      Case "frmPatientDosingReport"
         If giTotalPrintPages Then PrintDosingEventsHeader
   End Select

   giTotalPrintPages = giTotalPrintPages + 1
End Sub
```

frmDeviceDiagnostics.frm - File Declarations

```
Attribute VB_Name = "frmDeviceDiagnostics"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
```

```
Private Sub btnChangeBatteries_Click()
   Call ChangeBatteriesRequest
End Sub
```

```
Private Sub btnClose_Click()
   Unload Me
End Sub
```

```
Private Sub btnReadEntireContents_Click()
   Dim r As Integer, lErrorCode As Long, i As Integer

   r = ValidatePatientDataSaved   'ensure that previous patient data was saved before proceeding
   If r = vbCancel Then Exit Sub

   btnReadEntireContents.Enabled = False      'prevent recursive calls to device
   btnSendData.Enabled = False                'prevent recursive calls to device
   gbKeepPollingDevice = False                'stop polling for now
   Wait 0.25

   txtPatientLastName = ""                    'clear out the text boxes before reading data
   txtPatientFirstName = ""                   'clear out the text boxes before reading data
   txtDrug.Clear
   txtPatientID = ""
   txtTxCenter = ""
   txtOrgan.Clear
   txtSerialNumber = ""
   txtDoseSize = ""
   txtDoseTime(1) = ""
   txtDoseTime(2) = ""
   txtDoseTime(3) = ""
   txtDoseTime(4) = ""
   txtDosesPerDay = ""
   txtDoseLockoutHours = ""
   txtDeviceStarted = ""
   txtMedicationRemaining = ""
   txtBatteryChangeTimer = ""
   txtEventCount = ""
   txtFirmwareVer = ""

   r = Comm_ReadEntireMemoryContents(PAT_DATA, lErrorCode)
   If r Then
      PopulateDeviceDiagDialog PAT_DATA, Me
      PAT_DATA.sPatientDataFileName = ""
      frmMain.mnuFileSave.Enabled = False
   Else
      EraseDataInMemory PAT_DATA
   End If

   gbKeepPollingDevice = True                 'start polling again
   btnReadEntireContents.Enabled = True       're-enable button
   btnSendData.Enabled = True
   RefreshAllOpenForms
End Sub
```

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```
Private Sub btnSendData_Click()
  Dim i As Integer, r As Integer, lErrorCode As Long

  r = ValidateDoseNumbers(Me)
  If r = False Then Exit Sub

  Beep
  r = MsgBox("Patient Information and Dosing Information currently in the CycloTech device will be changed if you continue.  Medication
  data will be preserved." + vbCrLf + vbCrLf + "Do you want to continue?", vbYesNo + vbQuestion, "Device Data being changed")
  If r = vbNo Then Exit Sub

  btnSendData.Enabled = False            'prevent recursive calls to device
  btnReadEntireContents.Enabled = False
  gbKeepPollingDevice = False            'stop polling for now
  Wait 0.25

  On Error GoTo btnSendData_Click_Error

  r = Comm_SendCustomData(PAT_DATA, DATA_BEGIN_CUSTOM1, lErrorCode)
  If lErrorCode Then Error lErrorCode          'error number

  r = Comm_SendCustomData(PAT_DATA, DATA_BEGIN_CUSTOM2, lErrorCode)       'send to device
  If lErrorCode Then Error lErrorCode          'error number

  r = Comm_SendCustomData(PAT_DATA, DATA_BEGIN_CUSTOM3, lErrorCode)       'send to device
  If lErrorCode Then Error lErrorCode          'error number

  r = Comm_SendCustomData(PAT_DATA, DATA_BEGIN_CUSTOM4, lErrorCode)       'send to device
  If lErrorCode Then Error lErrorCode          'error number

  'ensure that the values in the text boxes are converted into the global structure
  For i = 1 To 4
    If IsDate(txtDoseTime(i)) Then
      PAT_DATA.dPrescribedDoseTime(i) = TimeValue(txtDoseTime(i))       'save Dose Interval
    Else
      PAT_DATA.dPrescribedDoseTime(i) = -1       'indicate that no time was set
    End If
  Next i

  r = Comm_SendDosingParams(PAT_DATA, lErrorCode)
  If lErrorCode Then Error lErrorCode          'error number


btnSendData_Click_Exit:
  btnSendData.Enabled = True        're-enable button
  btnReadEntireContents.Enabled = True
  gbKeepPollingDevice = True        'continue polling device
  Exit Sub


btnSendData_Click_Error:
  DisplayErrorMessage lErrorCode
'  Resume 0  'temp test
  Resume btnSendData_Click_Exit
End Sub
```

```
Private Sub Form_Activate()
   PopulateDeviceDiagDialog PAT_DATA, Me
   Comm_InitializeCommPort     'initialize the comm port from INI file settings

   lblCommPort.Caption = " " + CStr(giCommPort)
   lblSettings.Caption = " " + gsCommDeviceSettings
   lblDeviceWaitTime = " " + CStr(giDeviceResponseWait)

'  gbCommBusy = False          'reset flag
'  gbCommReplyPending = False  'reset flag
   gbKeepPollingDevice = True     'continue polling device
   PollDeviceContinually Me
   SetPrinterIcon False, ""
End Sub
```

```
Private Sub Form_Initialize()
   Me.Left = 0
   Me.Top = 0
End Sub
```

```
Private Sub Form_Load()
   Unload frmDeviceInitialize
   Unload frmReadDeviceData
   gbCommOK = 99   'reset flag that will give an indication as to the communication status.
End Sub
```

```
Private Sub Form_Unload(Cancel As Integer)
   Dim r As Integer

   r = ValidateDoseNumbers(Me)
   If r = False Then Cancel = True

   gbKeepPollingDevice = False     'stop polling the device
   Wait 0.1
End Sub
```

```
Private Sub txtDoseTime_Change(Index As Integer)
   If IsDate(txtDoseTime(Index)) Then
      PAT_DATA.dPrescribedDoseTime(Index) = TimeValue(txtDoseTime(Index))      'save Dose Interval
   Else
      PAT_DATA.dPrescribedDoseTime(Index) = -1    'indicate that no time was set
   End If
End Sub
```

```
Private Sub txtDoseLockoutHours_Change()
   PAT_DATA.sDoseLockoutHours = txtDoseLockoutHours        'save Dose Lockout Hours
End Sub
```

```
Private Sub txtDoseSize_Change()
   PAT_DATA.sDoseSize = txtDoseSize        'save Dose Size
End Sub
```

```
Private Sub txtDosesPerDay_Change()
   PAT_DATA.iDosesPerDay = Val(txtDosesPerDay)        'save Doses per day
End Sub
```

```
Private Sub txtDrug_Click()
   PAT_DATA.sDrug = txtDrug        'save field
End Sub
```

```
Private Sub txtOrgan_Click()
   PAT_DATA.sOrgan = txtOrgan        'save field
End Sub
```

```
Private Sub txtPatientFirstName_Change()
   PAT_DATA.sPatientFirstName = txtPatientFirstName        'save field
End Sub
```

```
Private Sub txtPatientID_Change()
   PAT_DATA.sPatientID = txtPatientID        'save Patient ID
End Sub
```

```
Private Sub txtPatientLastName_Change()
   PAT_DATA.sPatientLastName = txtPatientLastName        'save field
End Sub
```

```
Private Sub txtSerialNumber_Change()
   PAT_DATA.sSerialNumber = txtSerialNumber        'save serial number
End Sub
```

```
Private Sub txtTxCenter_Change()
  PAT_DATA.sTxCenter = txtTxCenter        'save field
End Sub
```

```
Private Sub UpDownDoseTime_DownClick(Index As Integer)
  Dim fDalyIncrement As Single, iIndex As Integer

  If IsDate(txtDoseTime(Index)) Then
    iIndex = TimeValue(txtDoseTime(Index)) * 24
    iIndex = iIndex - 1
    If iIndex < 0 Then
      txtDoseTime(Index) = ""
      Exit Sub
    End If
  Else
    iIndex = 23
  End If

  fDalyIncrement = (iIndex / 24)
  txtDoseTime(Index) = " " + Format$(TimeValue(CDate(fDalyIncrement)), gsTimeDisplayFormat)
End Sub
```

```
Private Sub UpDownDoseTime_UpClick(Index As Integer)
  Dim fDalyIncrement As Single, iIndex As Integer

  If IsDate(txtDoseTime(Index)) Then
    iIndex = TimeValue(txtDoseTime(Index)) * 24
    iIndex = iIndex + 1
    If iIndex > 23 Then
      txtDoseTime(Index) = ""
      Exit Sub
    End If
  Else
    iIndex = 0
  End If

  fDalyIncrement = (iIndex / 24)
  txtDoseTime(Index) = " " + Format$(TimeValue(CDate(fDalyIncrement)), gsTimeDisplayFormat)

End Sub
```

```
Attribute VB_Name = "frmFaxStatus"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
```

```
Private Sub cmdCancel_Click()
   On Error Resume Next
'  gcFax.CancelFax gcFax.FaxLogID
   Unload Me

End Sub
```

```
Private Sub Form_Activate()
   SetPrinterIcon False, ""
End Sub
```

```
Private Sub Form_Load()
   lblDestination = ""
   lblPage = ""
   lblSpeed = ""
End Sub
```

```
Attribute VB_Name = "frmFaxSend"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
```

```
Sub ReloadGroupsList()
  Dim i As Integer

  With cmboGroups
    .Clear
    .AddItem ".Select Recipients Manually"
    For i = 1 To FAX_DATA.iGroupsTotal
If FAX_DATA.sGroupTitle(i) <> "" Then
  .AddItem FAX_DATA.sGroupTitle(i)
  .ItemData(.NewIndex) = i
End If
    Next i
  End With

End Sub
```

```
Sub ReloadLocationsList()
  Dim i As Integer

  With lstLocations
    .Clear
    For i = 1 To FAX_DATA.iLocTotal
.AddItem FAX_DATA.sLocPersonName(i)
.ItemData(.NewIndex) = i      'keep index
    Next i
  End With

End Sub
```

```
Private Sub btnAddGroup_Click()
  Dim i As Integer, r As Integer, sSection As String
  gsEditGroupName = ""
  gsEditGroupIndexes = ""

  Load frmFaxEditGroups
  frmFaxEditGroups.Show vbModal
  If gsEditGroupName = "" Then Exit Sub            'no name was entered

  i = GetIndexToFaxGroupName(gsEditGroupName)          'see if name is already in the list
  If i = 0 Then   'name is not in list yet
    sSection = "Fax Groups"
    With FAX_DATA
 'Add the new name to the fax data structure
 'Before saving new data, clear out the old strings
 r = WritePrivateProfileString(sSection, ByVal 0&, ByVal 0&, gsFaxFileSpec)
 .iGroupsTotal = .iGroupsTotal + 1    'increment count by one
 .sGroupTitle(.iGroupsTotal) = gsEditGroupName
 .sGroupNamesInTitle(.iGroupsTotal) = gsEditGroupIndexes
 SaveINISetting gsFaxFileSpec, sSection, "Total Groups", CStr(.iGroupsTotal)
 For i = 0 To .iGroupsTotal
   SaveINISetting gsFaxFileSpec, sSection, "Group " + CStr(i), .sGroupTitle(i)
   SaveINISetting gsFaxFileSpec, sSection, "Group Locations " + CStr(i), .sGroupNamesInTitle(i)
 Next i

 cmboGroups.AddItem gsEditGroupName
 cmboGroups.ItemData(cmboGroups.NewIndex) = .iGroupsTotal          'save index
 cmboGroups.ListIndex = cmboGroups.NewIndex
```

```
        End With

    Else   'this name already exist
        MsgBox "The name "" + gsEditGroupName + "" is already entered."
    End If

End Sub
```

```
Private Sub btnClose_Click()
    Unload Me
End Sub
```

```
Private Sub btnDeleteGroup_Click()
    Dim i As Integer, r As Integer, sMSG As String

    gsEditGroupName = cmboGroups.List(cmboGroups.ListIndex)
    sMSG = "The following name and related information will be permanently deleted." + vbCrLf + gsEditGroupName + vbCrLf + vbCrLf + "Do
      you want to delete it?"
    r = MsgBox(sMSG, vbYesNo + vbDefaultButton2 + vbQuestion, "Confirm Name Deletion")
    If r = vbNo Then Exit Sub

    RemoveGroupFromFaxList gsEditGroupName
    ReloadGroupsList
    cmboGroups.ListIndex = 0     'default to manual selections

End Sub
```

```
Private Sub btnDeleteName_Click()
    Dim i As Integer, r As Integer, sMSG As String

    gsEditName = lstLocations.List(lstLocations.ListIndex)
    sMSG = "The following name and related information will be permanently deleted." + vbCrLf + gsEditName + vbCrLf + vbCrLf + "Do you
     want to delete it?"
    r = MsgBox(sMSG, vbYesNo + vbDefaultButton2 + vbQuestion, "Confirm Name Deletion")
    If r = vbNo Then Exit Sub

    RemoveNameFromFaxList gsEditName
    ReloadLocationsList
    If lstLocations.ListCount < 1 Then
        btnDeleteName.Enabled = False
    End If

    cmboGroups_Click     'cause appropriate boxes to be reselected

End Sub
```

```
Private Sub btnEditGroup_Click()
  Dim I As Integer, r As Integer, sSection As String

  With cmboGroups
    gsEditGroupName = .List(.ListIndex)
    I = GetIndexToFaxGroupName(gsEditGroupName)          'get index from structure

    gsEditGroupIndexes = FAX_DATA.sGroupNamesInTitle(I)
    frmFaxEditGroups.Show vbModal

    .List(.ListIndex) = gsEditGroupName
  End With

  With FAX_DATA
    .sGroupTitle(I) = gsEditGroupName
    .sGroupNamesInTitle(I) = gsEditGroupIndexes
    r = WritePrivateProfileString(sSection, ByVal 0&, ByVal 0&, gsFaxFileSpec)
    SaveINISetting gsFaxFileSpec, sSection, "Total Groups", CStr(.iGroupsTotal)
    For I = 0 To .iGroupsTotal
 SaveINISetting gsFaxFileSpec, sSection, "Group " + CStr(I), .sGroupTitle(I)
 SaveINISetting gsFaxFileSpec, sSection, "Group Locations " + CStr(I), .sGroupNamesInTitle(I)
    Next I
  End With

  UpDateListBoxSelections gsEditGroupIndexes

End Sub
```

```
Private Sub btnEditName_Click()
  Dim I As Integer

  gsEditName = lstLocations.List(lstLocations.ListIndex)
  I = GetIndexToFaxLocName(gsEditName)          'get index from structure
  gsEditVoice = FAX_DATA.sLocVoiceNumber(I)
  gsEditFax = FAX_DATA.sLocFaxNumber(I)

  frmFaxEditLocations.Show vbModal
  lstLocations.List(lstLocations.ListIndex) = gsEditName
  FAX_DATA.sLocPersonName(I) = gsEditName
  FAX_DATA.sLocVoiceNumber(I) = gsEditVoice
  FAX_DATA.sLocFaxNumber(I) = gsEditFax

End Sub
```

```
Private Sub btnNew_Click()

End Sub
```

frmFaxSend.frm - btnNewName_G

12

```
Private Sub btnNewName_Click()
   Dim I As Integer

   gsEditName = ""
   gsEditVoice = ""
   gsEditFax = ""

   Load frmFaxEditLocations
   frmFaxEditLocations.Caption = "Enter New Name"
   frmFaxEditLocations.Show vbModal
   If gsEditName = "" Then Exit Sub      'no name was enetered

   I = GetIndexToFaxLocName(gsEditName)          'see if name is already in the list
   If I = 0 Then    'name is not in list yet
      With FAX_DATA
  'Add the new name to the fax data structure
  .iLocTotal = .iLocTotal + 1    'increment count by one
  .sLocPersonName(.iLocTotal) = gsEditName
  .sLocVoiceNumber(.iLocTotal) = gsEditVoice
  .sLocFaxNumber(.iLocTotal) = gsEditFax

  lstLocations.AddItem gsEditName
  lstLocations.ItemData(lstLocations.NewIndex) = .iLocTotal          'save index
      End With

   Else   'this name already exist
      MsgBox "The name " + gsEditName + " is already entered."
   End If

End Sub
```

```
Private Sub btnSendFax_Click()
   Dim I As Integer, r As Integer, sFileSpec As String, lErrorCode As Long
   Dim sSourceFileSpec As String, sDestFileSpec As String

   On Error GoTo btnSendFax_Error

   If Len(txtFileToSend) < 2 Then
      MsgBox "The is no information to fax.  Please open a patient file.", vbExclamation, "No File Selected"
      Exit Sub
   End If
   CreateTxtSummaryFile

   'Copy the report information to a text file for conversion to a fax document.
   sSourceFileSpec = App.Path + "\faxes\" + PAT_DATA.sPatientLastName + " " + PAT_DATA.sPatientFirstName + " " + PAT_DATA.
    sPatientID + ".txt"
   sDestFileSpec = App.Path + "\faxes\" + PAT_DATA.sPatientID + " " + PAT_DATA.sPatientID + ".fmf"
   r = FileExists(sDestFileSpec, lErrorCode)
   If r Then
      On Error Resume Next       ' this won't be needed if we can determine that the file is already open
      Kill sFileSpec
      On Error GoTo btnSendFax_Error
   End If

   If lstLocations.ListCount Then
      With gcFax
 ' frmMain.FaxMan1.ImportFiles "c:\faxes\temp.fmf", "c:\sample tif+c:\cover tif"
        .ImportFiles App.Path + "\faxes\temp.fmf", App.Path + "\faxes\Temp.txt"
  .ImportFiles sDestFileSpec, sSourceFileSpec
  .FaxFiles = sDestFileSpec
  .FaxResolution = FAX_DATA.bFaxResolution
  .UserCompany = FAX_DATA.sSenderCompany
```

```
        .UserName = FAX_DATA.sSenderName
        .UserVoiceNumber = FAX_DATA.sSenderVoiceNumber
        .UserFaxNumber = FAX_DATA.sSenderFaxNumber
        .FaxID = FAX_DATA.sFaxID
        .FaxRetries = FAX_DATA.lRetries
        .FaxRetryInterval = FAX_DATA.lRetryInterval
      End With
    End If

    'Loop through all check boxes in the list to see which ones to send faxes to
    For i = 0 To lstLocations.ListCount - 1
      With gcFax
    If lstLocations.Selected(i) Then     'this location is selected
      .FaxSubject = App.Title + " Report"
      .FaxName = FAX_DATA.sLocPersonName(lstLocations.ItemData(i) + 1)
      .FaxCompany = ""
      .FaxNumber = FAX_DATA.sDialPrefix + FAX_DATA.sLocFaxNumber(lstLocations.ItemData(i) + 1)
      .SendFax
    End If
      End With
    Next i

btnSendFax_Exit:
'   Unload Me   'must be unloaded because the status form is a nonmodal child form
    'and can not be displayed while a modal form is being displayed.
    Exit Sub

btnSendFax_Error:
    MsgBox "An uncorrectable error occurred while trying to fax the document.  Please try again.", vbExclamation, "Fax Error - " + Error$
    Resume btnSendFax_Exit

End Sub
```

```
Private Sub cmboGroups_Click()
    Dim i As Integer, r As Integer, j As Integer, sName As String


    With cmboGroups
      i = GetIndexToFaxGroupName(.List(.ListIndex))
      UpDateListBoxSelections FAX_DATA.sGroupNamesInTitle(i)

      If .ListIndex > 0 Then     'the manual selection was made
    btnEditGroup.Enabled = True
    btnDeleteGroup.Enabled = True

      Else
    btnEditGroup.Enabled = False
    btnDeleteGroup.Enabled = False
      End If

    End With

End Sub
```

```
Private Sub UpDateListBoxSelections(ByVal sGroup As String)
  Dim i As Integer, j As Integer, r As Integer, sTempList(100) As String

  With lstLocations
    .Clear
    For i = 0 To FAX_DATA.iLocTotal - 1
      .AddItem FAX_DATA.sLocPersonName(i + 1)
      .ItemData(.NewIndex) = i     'keep index
    Next i

    'Parse the attached locations and check the appropriate boxes
    r = ParseDelimString(sGroup, "|", sTempList())
    If r Then      'some locations are attached
      For j = 1 To r
        For i = 0 To .ListCount - 1    'step through the names and check appropriate ones
          If .ItemData(i) = sTempList(j) Then
            .Selected(i) = True
            Exit For
          End If
        Next i
      Next j
    End If
  End With

End Sub
```

```
Private Sub Form_Activate()
  SetPrinterIcon False, ""
End Sub
```

```
Private Sub Form_Load()
  txtFileToSend = PAT_DATA.sPatientDataFileName
  GetFaxLocations
  ReloadLocationsList
  ReloadGroupsList
  'make sure it is in range
  If cmboGroups.ListCount >= FAX_DATA.iGroupLastSelected Then cmboGroups.ListIndex = FAX_DATA.iGroupLastSelected
End Sub
```

```
Private Sub Form_Unload(Cancel As Integer)

  Dim i As Integer, r As Integer, sSection As String

  With FAX_DATA
    sSection = "User Selections"
    .iGroupLastSelected = cmboGroups.ListIndex
    SaveINISetting gsFaxFileSpec, sSection, "Last Group Selected", CStr(.iGroupLastSelected)
  End With

  With FAX_DATA
    sSection = "Fax Locations"
    'Before saving new data, clear out the old strings
    r = WritePrivateProfileString(sSection, ByVal 0&, ByVal 0&, gsFaxFileSpec)
    SaveINISetting gsFaxFileSpec, sSection, "Total Locations", CStr(.iLocTotal)
    For i = 1 To .iLocTotal
      SaveINISetting gsFaxFileSpec, sSection, "Person " + CStr(i), .sLocPersonName(i)
      SaveINISetting gsFaxFileSpec, sSection, "Fax " + CStr(i), .sLocFaxNumber(i)
      SaveINISetting gsFaxFileSpec, sSection, "Voice " + CStr(i), .sLocVoiceNumber(i)
    Next i

    sSection = "Fax Groups"
    'Before saving new data, clear out the old strings
    r = WritePrivateProfileString(sSection, ByVal 0&, ByVal 0&, gsFaxFileSpec)
    SaveINISetting gsFaxFileSpec, sSection, "Total Groups", CStr(.iGroupsTotal)
    For i = 0 To .iGroupsTotal
        SaveINISetting gsFaxFileSpec, sSection, "Group " + CStr(i), .sGroupTitle(i)
        SaveINISetting gsFaxFileSpec, sSection, "Group Locations " + CStr(i), .sGroupNamesInTitle(i)
    Next i

  End With
End Sub
```

```
Private Sub lstLocations_Click()
  Dim i As Integer, sTemp As String

  btnEditName.Enabled = True
  btnDeleteName.Enabled = True

  If cmboGroups.ListIndex = 0 Then        'manual selection of groups is enabled
    With lstLocations
      For i = 0 To .ListCount - 1
        If .Selected(i) Then sTemp = sTemp + CStr(.ItemData(i)) + "|"
      Next i
    End With
    FAX_DATA.sGroupNamesInTitle(0) = sTemp        'position 0 holds manual selections
  End If
End Sub
```

```
Private Sub lstLocations_DblClick()
  btnEditName_Click
End Sub
```

frmFaxLog.frm - File Declaration

```
Attribute VB_Name = "frmFaxLog"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
```

```
Private Sub btnClose_Click()
  Me.Hide   'stay loaded because it contains the fax control
End Sub
```

```
Private Sub Form_Activate()
  SetPrinterIcon False, ""
End Sub
```

```
Private Sub Form_Load()
  optViewFaxes_Click 1     'cause the "Sent" button to be clicked
End Sub
```

```
Private Sub Form_Resize()
  btnClose.Left = Me.Width - btnClose.Width - 250
  FaxMan1.Width = Me.Width - FaxMan1.Left - 250
  FaxMan1.Height = Me.Height - FaxMan1.Top - 500
End Sub
```

```
Private Sub optViewFaxes_Click(Index As Integer)
  Select Case Index
    Case 0
      FaxMan1.Log = Pending
    Case 1
      FaxMan1.Log = Completed
    Case 2
      FaxMan1.Log = Failed
  End Select
End Sub
```

frmFaxEditGroups.frm - File Declara...ns

```
Attribute VB_Name = "frmFaxEditGroups"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
```

```
Private Sub btnClose_Click()
  Unload Me

End Sub
```

```
Private Sub Form_Activate()
  SetPrinterIcon False, ""
End Sub
```

```
Private Sub Form_Load()
  Dim i As Integer, j As Integer, r As Integer, sTempList(100) As String

  txtName = gsEditGroupName
  With lstLocations
    .Clear
    For i = 0 To FAX_DATA.iLocTotal - 1
      .AddItem FAX_DATA.sLocPersonName(i + 1)
      .ItemData(.NewIndex) = i    'keep index
    Next i

    'Parse the attached locations and check the appropriate boxes
    r = ParseDelimString(gsEditGroupIndexes, "|", sTempList())
    If r Then      'some locations are attached
      For j = 1 To r
        For i = 0 To .ListCount - 1   'step through the names and check appropriate ones
          If .ItemData(i) = sTempList(j) Then
            .Selected(i) = True
            Exit For
          End If
        Next i
      Next j
    End If
  End With
End Sub
```

```
Private Sub Form_Unload(Cancel As Integer)
  Dim i As Integer, r As Integer, sSection As String

  gsEditGroupIndexes = ""
  With lstLocations
    For i = 0 To .ListCount - 1
      'add this index to the list
      If .Selected(i) Then gsEditGroupIndexes = gsEditGroupIndexes + CStr(.ItemData(i)) + "|"
    Next i
  End With

  gsEditGroupName = txtName
End Sub
```

frmFaxEditGroups.frm - lstLocations_K\ ,.'ress

14

```
Private Sub lstLocations_KeyPress(KeyAscii As Integer)
    If KeyAscii = 13 Then    'the "Enter" key was pressed
        btnClose.SetFocus
        KeyAscii = 0         'change it to a tab key
    End If
End Sub
```

```
Private Sub txtName_KeyPress(KeyAscii As Integer)
    If KeyAscii = 13 Then    'the "Enter" key was pressed
        lstLocations.SetFocus
        KeyAscii = 0         'change it to a tab key
    End If
End Sub
```

frmFaxEditLocations.frm - File Declarations

```
Attribute VB_Name = "frmFaxEditLocations"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
  Dim bxSaveData As Boolean

Private Sub btnCancel_Click()
  Unload Me
End Sub

Private Sub btnClose_Click()
  bxSaveData = True
  Unload Me
End Sub

Private Sub Form_Activate()
  txtName.SetFocus
  SetPrinterIcon False, ""
End Sub

Private Sub Form_Load()
  txtName = gsEditName
  txtVoiceNumber = gsEditVoice
  txtFaxNumber = gsEditFax
End Sub

Private Sub Form_Unload(Cancel As Integer)
  If bxSaveData Then
    gsEditName = Trim$(txtName)
    gsEditVoice = Trim$(txtVoiceNumber)
    gsEditFax = Trim$(txtFaxNumber)
  End If
End Sub

Private Sub txtFax_KeyPress(KeyAscii As Integer)
  If KeyAscii = 13 Then    'the "Enter" key was pressed
    btnClose.SetFocus
    KeyAscii = 0       'change it to a tab key
  End If
End Sub
```

frmFaxEditLocations.frm - txtFaxNumber_. .yPress

```
Private Sub txtFaxNumber_KeyPress(KeyAscii As Integer)
    If KeyAscii = 13 Then    'the "Enter" key was pressed
        txtVoiceNumber.SetFocus
        KeyAscii = 0         'change it to a tab key
    End If
End Sub
```

```
Private Sub txtName_KeyPress(KeyAscii As Integer)
    If KeyAscii = 13 Then    'the "Enter" key was pressed
        txtFaxNumber.SetFocus
        KeyAscii = 0         'change it to a tab key
    End If
End Sub
```

```
Private Sub txtTelephone_KeyPress(KeyAscii As Integer)
    If KeyAscii = 13 Then    'the "Enter" key was pressed
        txtFaxNumber.SetFocus
        KeyAscii = 0         'change it to a tab key
    End If
End Sub
```

```
Private Sub txtVoiceNumber_KeyPress(KeyAscii As Integer)
    If KeyAscii = 13 Then    'the "Enter" key was pressed
        btnClose.SetFocus
        KeyAscii = 0         'change it to a tab key
    End If
End Sub
```

frmDeviceInitialize.frm - File Declara...s

14

```
Attribute VB_Name = "frmDeviceInitialize"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
```

```
Private Sub btnChangeBatteries_Click()
   btnChangeBatteries.Enabled = False        'prevent recursive calls to device
   Call ChangeBatteriesRequest
   btnChangeBatteries.Enabled = True         'enable button again
End Sub
```

```
Private Sub btnClose_Click()
   Unload Me

End Sub
```

```
Private Sub btnReadEntireContents_Click()
   Dim r As Integer, lErrorCode As Long, i As Integer

   r = ValidatePatientDataSaved   'ensure that previous patient data was saved before proceeding
   If r = vbCancel Then Exit Sub

   btnReadEntireContents.Enabled = False      'prevent recursive calls to device
   btnSendData.Enabled = False                'prevent recursive calls to device
   gbKeepPollingDevice = False                'stop polling for now
   Wait 0.25

   txtPatientLastName = ""           'clear out the text boxes before reading data
   txtPatientFirstName = ""          'clear out the text boxes before reading data
   txtPatientID = ""
   txtTxCenter = ""
   txtDrug.Clear
   txtOrgan.Clear
   txtSerialNumber = ""
   txtDoseSize = ""
   txtDoseTime(1) = ""
   txtDoseTime(2) = ""
   txtDoseTime(3) = ""
   txtDoseTime(4) = ""
   txtDosesPerDay = ""
   txtDoseLockoutHours = ""
   txtDeviceStarted = ""
   txtMedicationRemaining = ""
   txtBatteryChangeTimer = ""
   txtEventCount = ""
   txtPatientLastName.SetFocus       'take focus away from listbox
   Me.Refresh

   r = Comm_ReadEntireMemoryContents(PAT_DATA, lErrorCode)
   If r Then
      PopulateDeviceCommDialog PAT_DATA, Me
      PAT_DATA.sPatientDataFileName = ""
      frmMain.mnuFileSave.Enabled = False
   Else
      EraseDataInMemory PAT_DATA
      gbPatientDataNotSaved = False
      DisplayErrorMessage lErrorCode
   End If

   gbKeepPollingDevice = True               'start polling again
   btnReadEntireContents.Enabled = True          're-enable button
```

```
    btnSendData.Enabled = True
    RefreshAllOpenForms

End Sub

Private Sub btnSendData_Click()
    Dim i As Integer, r As Integer, lErrorCode As Long

    r = ValidateDoseNumbers(Me)
    If r = False Then Exit Sub

    Beep
    r = MsgBox("Patient Information and Dosing Information currently in the CycloTech device will be changed if you continue.  Medication
    data will be preserved." + vbCrLf + vbCrLf + "Do you want to continue?", vbYesNo + vbQuestion, "Device Data being changed")
    If r = vbNo Then Exit Sub

    btnSendData.Enabled = False                'prevent recursive calls to device
    btnReadEntireContents.Enabled = False
    gbKeepPollingDevice = False                'stop polling for now
    Wait 0.25

    On Error GoTo btnSendData_Click_Error

    r = Comm_SendCustomData(PAT_DATA, DATA_BEGIN_CUSTOM1, lErrorCode)
    If lErrorCode Then Error lErrorCode         'error number

    r = Comm_SendCustomData(PAT_DATA, DATA_BEGIN_CUSTOM2, lErrorCode)       'send to device
    If lErrorCode Then Error lErrorCode         'error number

    r = Comm_SendCustomData(PAT_DATA, DATA_BEGIN_CUSTOM3, lErrorCode)       'send to device
    If lErrorCode Then Error lErrorCode         'error number

    r = Comm_SendCustomData(PAT_DATA, DATA_BEGIN_CUSTOM4, lErrorCode)       'send to device
    If lErrorCode Then Error lErrorCode         'error number

    'ensure that the values in the text boxes are converted into the global structure
    For I = 1 To 4
        If IsDate(txtDoseTime(I)) Then
            PAT_DATA.dPrescribedDoseTime(I) = TimeValue(txtDoseTime(I))     'save Dose Interval
        Else
            PAT_DATA.dPrescribedDoseTime(I) = -1      'indicate that no time was set
        End If
    Next I

    r = Comm_SendDosingParams(PAT_DATA, lErrorCode)
    If lErrorCode Then Error lErrorCode         'error number


btnSendData_Click_Exit:
    btnSendData.Enabled = True       're-enable button
    btnReadEntireContents.Enabled = True
    gbKeepPollingDevice = True       'continue polling device
    Exit Sub


btnSendData_Click_Error:
    DisplayErrorMessage lErrorCode
'   Resume 0  'temp test
    Resume btnSendData_Click_Exit
End Sub
```

```
Private Sub Form_Activate()
    PopulateDeviceCommDialog PAT_DATA, Me
    Comm_InitializeCommPort          'initialize the comm port from INI file settings

    gbKeepPollingDevice = True       'continue polling device
    PollDeviceContinually Me
    SetPrinterIcon False, ""
End Sub
```

```
Private Sub Form_Load()
    Me.Left = 0
    Me.Top = 0
    Unload frmReadDeviceData    'don't need this form
    gbCommOK = 99    'reset flag that will give an indication as to the communication status.
End Sub
```

```
Private Sub Form_QueryUnload(Cancel As Integer, UnloadMode As Integer)
    Dim r As Integer

    r = ValidateDoseNumbers(Me)
    If r = False Then Cancel = True
End Sub
```

```
Private Sub Form_Unload(Cancel As Integer)
    gbKeepPollingDevice = False     'stop polling the device
    Wait 0.1
End Sub
```

```
Private Sub txtDoseLockoutHours_Change()
    PAT_DATA.sDoseLockoutHours = txtDoseLockoutHours        'save Dose Lockout Hours
End Sub
```

```
Private Sub txtDoseSize_Change()
    PAT_DATA.sDoseSize = txtDoseSize        'save Dose Size
End Sub
```

```
Private Sub txtDosesPerDay_Change()
    PAT_DATA.iDosesPerDay = Val(txtDosesPerDay)       'save Doses per day
End Sub
```

```
Private Sub txtDrug_Click()
   PAT_DATA.sDrug = txtDrug
End Sub
```

```
Private Sub txtOrgan_Click()
   PAT_DATA.sOrgan = txtOrgan
End Sub
```

```
Private Sub txtPatientFirstName_Change()
   PAT_DATA.sPatientFirstName = txtPatientFirstName         'save Patient name
End Sub
```

```
Private Sub txtPatientID_Change()
   PAT_DATA.sPatientID = txtPatientID
End Sub
```

```
Private Sub txtPatientLastName_Change()
   PAT_DATA.sPatientLastName = txtPatientLastName         'save Patient name
End Sub
```

```
Private Sub txtSerialNumber_Change()
   PAT_DATA.sSerialNumber = txtSerialNumber      'save serial number
End Sub
```

```
Private Sub txtTxCenter_Change()
   PAT_DATA.sTxCenter = txtTxCenter
End Sub
```

```
Private Sub UpDownDoseTime_DownClick(Index As Integer)
   Dim fDalyIncrement As Single, iIndex As Integer

   If IsDate(txtDoseTime(Index)) Then
      iIndex = TimeValue(txtDoseTime(Index)) * 24
      iIndex = iIndex - 1
      If iIndex < 0 Then
         txtDoseTime(Index) = ""
         Exit Sub
      End If
   Else
      iIndex = 23
   End If

   fDalyIncrement = (iIndex / 24)
   txtDoseTime(Index) = " " + Format$(TimeValue(CDate(fDalyIncrement)), gsTimeDisplayFormat)
End Sub
```

frmDeviceInitialize.frm - UpDownDoseTin _UpClick

```
Private Sub UpDownDoseTime_UpClick(Index As Integer)
  Dim fDalyIncrement As Single, iIndex As Integer

  If IsDate(txtDoseTime(Index)) Then
     iIndex = TimeValue(txtDoseTime(Index)) * 24
     iIndex = iIndex + 1
     If iIndex > 23 Then
        txtDoseTime(Index) = ""
        Exit Sub
     End If
  Else
     iIndex = 0
  End If

  fDalyIncrement = (iIndex / 24)
  txtDoseTime(Index) = " " + Format$(TimeValue(CDate(fDalyIncrement)), gsTimeDisplayFormat)
End Sub
```

frmGetDateTime frm - File Declarati

15

```
Attribute VB_Name = "frmGetDateTime"
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit

Private Sub btnDateCancel_Click()
  gdTempDateTime = 0        'indicate to caller that a cancel occurred
  giTempCya = 0
  gfTempCreatinine = 0
  gsTempCustomInfo = ""
  Unload frmGetDateTime
End Sub

Private Sub cmdDateOK_Click()
  'validate the text boxes before exit
  If Val(txtCya.Text) = 0 Then
    MsgBox "Please enter a CYA level", vbExclamation, "Value Required"
    txtCya.SetFocus
    Exit Sub
  End If

  If Val(txtCreatinine.Text) = 0 Then
    MsgBox "Please enter a Creatinine level", vbExclamation, "Value Required"
    txtCreatinine.SetFocus
    Exit Sub
  End If

  'On Error Resume Next
  gdTempDateTime = CVDate(txtDateEntry.Value)      'get date from control
  gdTempDateTime = gdTempDateTime + CVDate(txtTimeEntry.Time)
  giTempCya = txtCya.Text
  gfTempCreatinine = txtCreatinine.Text
  gsTempCustomInfo = txtCustomInfo

  Unload frmGetDateTime
  'On Error GoTo 0
End Sub

Private Sub Form_Activate()
  SetPrinterIcon False, ""
End Sub

Private Sub Form_Load()
  Me.Width = pnlGetDate.Width + 90
  Me.Height = pnlGetDate.Height + 90
  txtTimeEntry.Time = CStr(Time)
End Sub
```

Function Index

Function Index

Function Index

Function Index

Function Index

Function Index

Function Index

Function Index

Function Index

Function Index

Function Index

Function Index

CLAIMS

What is claimed is:

1. A computer-implemented method for monitoring medication dosing by a patient, comprising:
storing patient data, including a medication name and amounts of the medication prescribed for a patient;
retrieving patient data, including times and amounts of the medication delivered to the patient;
evaluating data by analyzing drug dispensing data and patient data to determine compliance of the delivered medication to the prescribed medication; and
displaying the evaluated data.

2. The method of claim 1, wherein storing patient data further comprises storing information from a remote device over a communications line.

3. The method of claim 1, wherein storing patient data further comprises storing data from local memory.

4. The method of claim 1, wherein storing patient data further comprises storing user input.

5. The method of claim 1, wherein retrieving patient data further comprises retrieving data from local memory.

6. The method of claim 1, wherein retrieving patient data further comprises retrieving user input.

7. The method of claim 1, wherein displaying the evaluated data displays the evaluated data in a patient summary report.

8. The method of claim 1, further comprising printing the evaluated data.

9. The method of claim 1, wherein dosages of multiple patients are monitored, the method comprising:

storing patient data for a plurality of patients, including the medication name and amounts of the medication prescribed for the plurality of patients;
retrieving patient data for the plurality of patients, including times and amounts of medication delivered to the plurality of patients;
evaluating data by analyzing the stored patient data for the plurality of patients to determine overall compliance of the delivered medication to the prescribed medication; and displaying the evaluated data.

10. The method of Claim 1, wherein:
storing patient data includes storing amounts of an immunosuppressive medication prescribed for a patient; and
retrieving patient data includes retrieving times and amounts of the immunosuppressive medication delivered to the patient.

11. The method of Claim 1, wherein:
storing patient data includes storing amounts of an analgesic drug prescribed for a patient; and
retrieving patient data includes retrieving times and amounts of the analgesic drug delivered to the patient.

12. The method of Claim 1, wherein:
storing patient data includes storing amounts of an opiate agonist prescribed for a patient; and
retrieving patient data includes retrieving times and amounts of the opiate agonist delivered to the patient.

13. The method of Claim 1, wherein:
storing patient data includes storing amounts of an opiate antagonist prescribed for a patient; and
retrieving patient data includes retrieving times and amounts of the opiate antagonist delivered to the patient.

14. The method of Claim 1, wherein:
storing patient data includes storing amounts of a liquid drug prescribed for a patient; and
retrieving patient data includes retrieving times and amounts of the liquid drug delivered to the patient.

15. The method of Claim 1, wherein the step of retrieving patient data includes retrieving data transmitted via a carrier wave.

16. A computer-implemented method for monitoring patient dosages, comprising:
retrieving dosing data, including times and amounts of medication prescribed for a patient;
retrieving patient data, including times and amounts of medication delivered to the patient;
determining evaluation data by analyzing the retrieved dosing and patient data to determine compliance of the delivered medication to the prescribed medication; and
displaying the evaluation data.

17. A memory device storing computer readable instructions for aiding a computer to monitor patient dosages of a medicine, comprising:
instructions for storing patient data, including the medication name and amounts of the medication prescribed for a patient;
instructions for retrieving patient data, including times and amounts of the medication delivered to the patient;
instructions for evaluating data by analyzing drug dispensing data and the patient data to determine compliance of the delivered medication to the prescribed medication; and
instructions for displaying the evaluated data.

18. A computer system for monitoring patient dosages, comprising:
a processor for storing patient data, including a name of a medication and amounts of the medication prescribed for a patient and for retrieving patient data, including times and amounts of the medication delivered to the patient, and evaluating data by analyzing drug dispensing data and the patient data to determine compliance of the delivered medieation to the prescribed medication; and
a monitor for displaying the evaluated data.

19. The computer system of claim 18, further comprising a communications link linking the processor to a remote device, wherein the retrieved patient data may be received from the remote device over the communications link.

20. The computer system of claim 19, wherein the retrieved patient data is received from the remote device over the communications link via a carrier wave.

21. The computer system of claim 20, further comprising an input device coupled to the processor, wherein the retrieved patient data may be received through the input device.

22. A method of graphically displaying drug compliance information, the method comprising the computer-implemented steps of:
receiving dosage data representing one or more quantities and one or more administration times for delivering a drug;
receiving administration data representing one or more times when each of a plurality of doses of the drug was delivered;
generating a graphical display of the drug compliance information on a display device, wherein the graphical display comprises one or more elements that each correspond to a time period;
displaying, within a first element among the elements, one or more icons that represent each dose due within said first period; and
rendering each of the icons in one of a plurality of formats based on said dosage data and said administration data.

23. The method of Claim 22, wherein the step of rendering includes the steps of:
determining whether a particular dose due within the first period was correctly delivered based on said scheduling data and said administration data;
rendering a particular icon in a first format when the particular dose was incorrectly delivered; and
rendering the particular icon in a second format when the particular dose was correctly delivered.

24. The method of Claim 22, wherein the step of receiving administration data includes the step of receiving data indicating an administration time for said particular dose, and wherein the method further includes the steps of:
receiving data indicating a time period in which said drug should be delivered;
determining whether the particular dose was delivered within the time period; and
rendering the icon in a third format when the particular dose was delivered within the time period.

25. The method of Claim 22, wherein the step of receiving administration data includes receiving data indicating an administration time for said particular dose, and wherein the method further includes the steps of:
receiving data indicating a time period within the administration time in which said drug should be delivered;
determining whether the particular dose was delivered within the time period; and
rendering the icon as a particular format when the particular dose was delivered within the time period.

26. The method of Claim 22, further including the steps of:
displaying a graphical object;
displaying a second set of icons along an axis of the graphical object, in which the second set includes an icon for each dose of the drug delivered within a first period, and the position of each of the second set along the axis identifies when the respective dose was delivered.

27. The method of Claim 26, further including the step of said user selecting said first grid element associated with said first period.

28. The method of Claim 27, further including the steps of:
selecting a first icon of the second set of icons, wherein the first icon is associated with a first dose, wherein the first dose is associated with a first administration time; and
displaying additional information about the first dose, including the administration time.

29. The method of Claim 22, wherein the step of receiving dosage data includes the step of receiving dosage data from a dosage dispensing device.

30. The method of Claim 29, wherein the step of receiving dosage data from a dosage dispensing device includes the step of receiving dosage data from a portable medication administration device.

31. The method of Claim 22, wherein the step of receiving administration data includes the step of receiving administration data from a portable medication administration device.

32. A method of generating data representing patient medication administration compliance, the method including the steps of:

receiving dosage data indicating parameter values for delivering a drug to a patient, wherein the parameter values specify one or more quantities and one or more administration times for delivering doses of the drug to the patient;

receiving administration data that indicates when each of a plurality of doses of the drug was administrated to the patient; and

generating data indicating a portion of the plurality of doses that was delivered according to the parameter values.

33. The method of Claim 32, wherein the step of generating data includes the steps of generating one or more values specifying a portion of said plurality of doses that was delivered within a specified time period of said administration times.

34. The method of Claim 32, further including the step of receiving data specifying a time period for which to generate said compliance data, the time period containing a plurality of days; and

wherein the step of generating data includes the steps of generating, for each day within a period, one or more values specifying a portion of the plurality of doses scheduled for the day that were delivered.

35. A method of managing the administration of drugs to a patient, the method comprising the steps of:

receiving dosage data that represents one or more administration quantities and one or more administration times for delivering doses of a drug to a patient;

transmitting, to a dosage dispensing device, data that specifies said one or more administration quantities and one or more administration times;

receiving administration data that indicates how each of a plurality of doses of the drug was administrated to the patient; and

storing the administration data in a memory device.

36. The method of Claim 35, further including the steps of:
receiving data specifying a lockout period that must elapse after delivering a dose before another dose is delivered to the patient; and
transmitting, to the dosage dispensing device, data that specifies the lockout period.

37. The method of Claim 36, wherein:
the step of receiving dosage data includes the steps of receiving data indicating a volume to deliver; and

the step of transmitting includes the steps of transmitting, to a dosage dispensing device, data that specifies said volume.

38. The method of Claim 35, wherein:
the step of receiving dosage data includes the steps of receiving data specifying a dose of a liquid drug; and
the step of transmitting includes the steps of transmitting, to a dosage dispensing device, data that specifies a dose of said liquid drug.

39. The method of Claim 38, further including the steps of:
receiving data indicating that a drug container has been removed from the dosage dispensing device;
storing the data indicating that said drug container has been removed; and
reporting the data in a report of medication events.

40. The method of Claim 38, further including the steps of:
receiving data indicating that a drug container has been inserted into the dosage dispensing device;
storing the data indicating that said drug container has been inserted; and
reporting the data in a report of medication events.

41. A method of managing administration of drugs to a patient, the method comprising the steps of:
receiving data indicating administration times for a drug to be delivered to a patient and a lockout period that must elapse after delivering a dose before another dose is delivered to said patient; and
transmitting, to a dosage dispensing device, data that specifies the lockout period.

42. The method of Claim 41, wherein the step of transmitting includes the steps of transmitting to a dosage dispensing device that dispenses a liquid.

FIG. 1

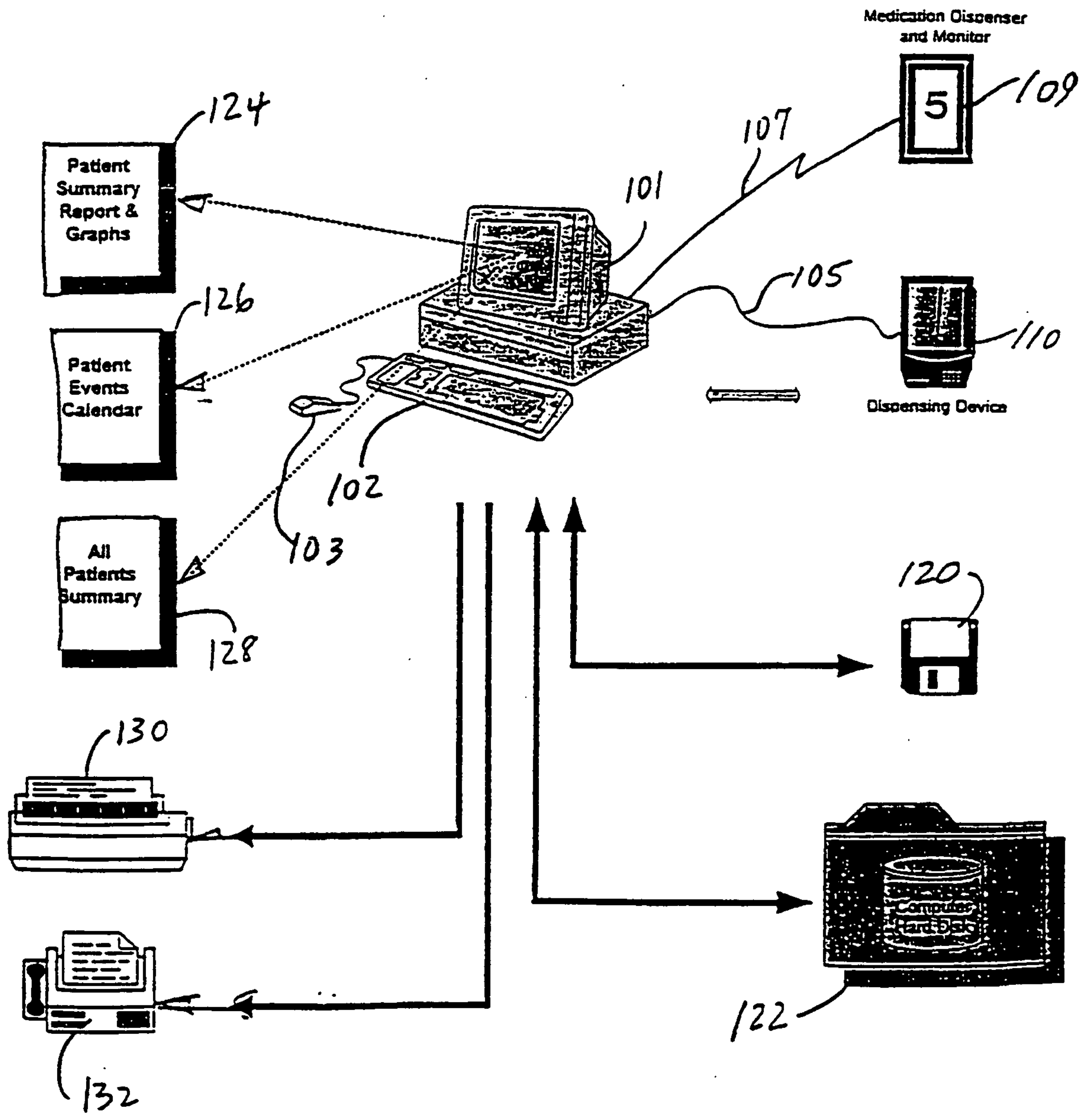

Medication Dispenser and Monitor
5
109
107
101
105
110
Dispensing Device
124
Patient Summary Report & Graphs
126
Patient Events Calendar
All Patients Summary
128
102
103
120
130
Computer Hard Disk
122
132

FIG. 2

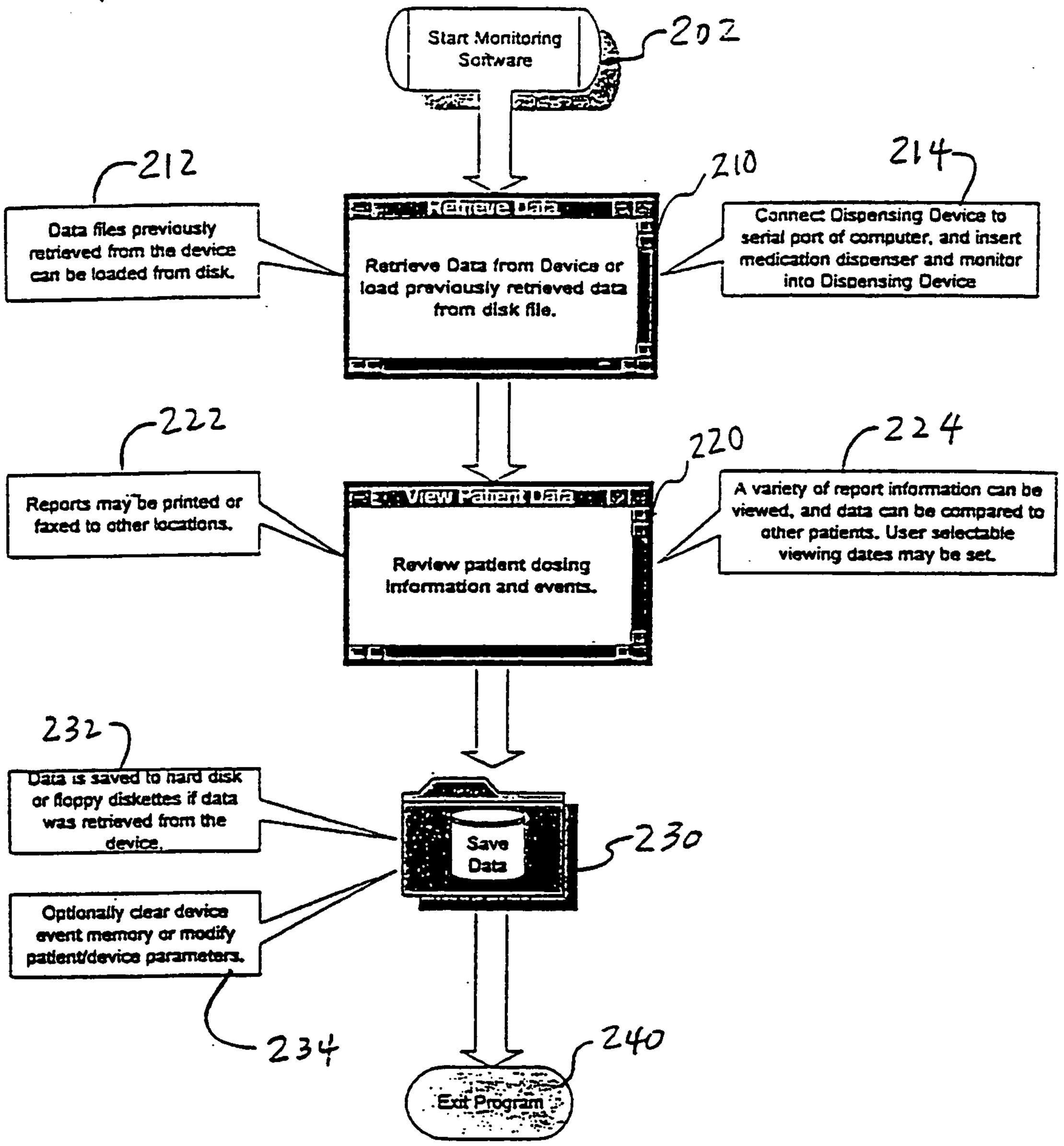
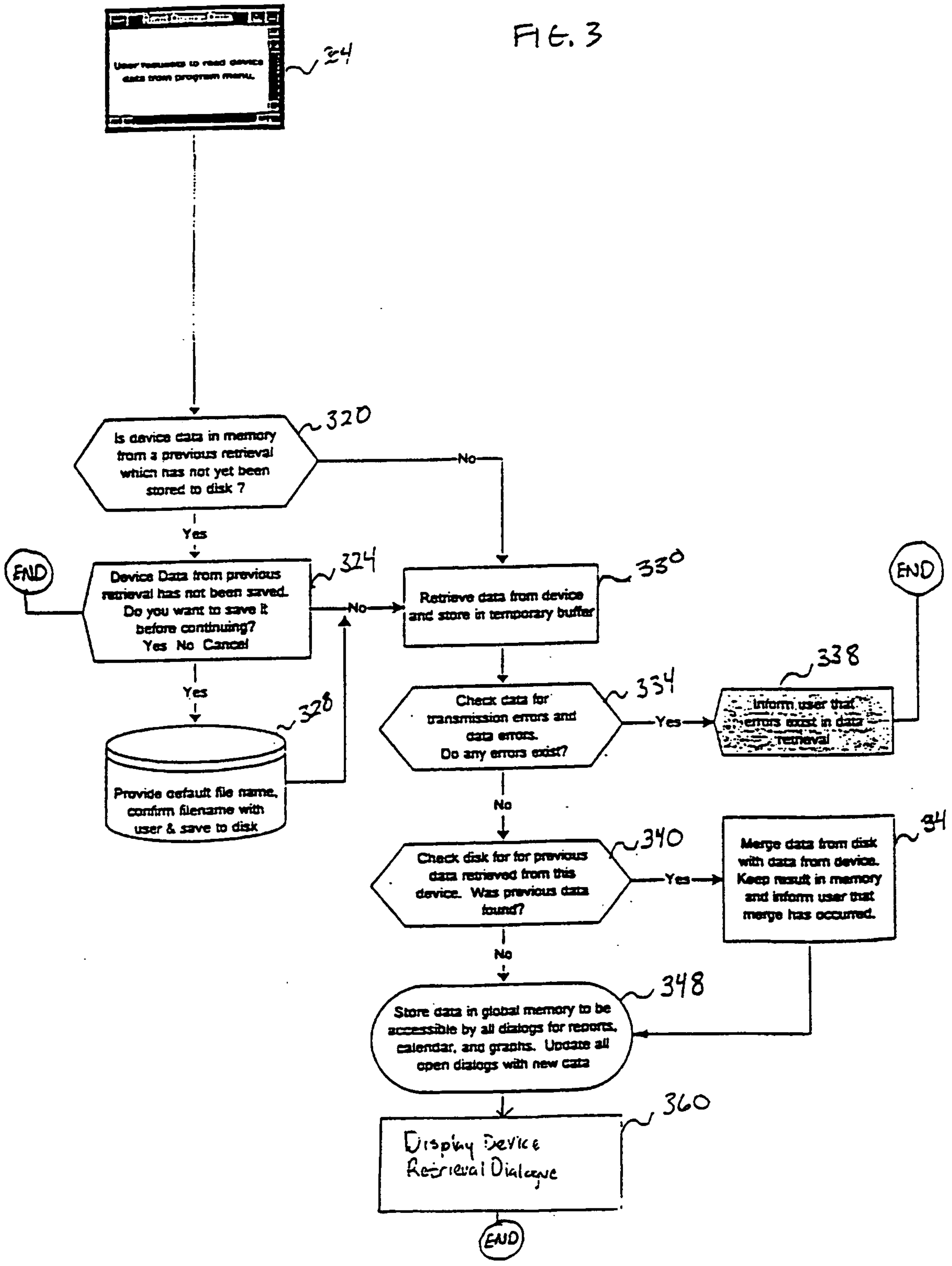

Start Monitoring Software
202
212
Data files previously retrieved from the device can be loaded from disk.
210
Retrieve Data
Retrieve Data from Device or load previously retrieved data from disk file.
214
Connect Dispensing Device to serial port of computer, and insert medication dispenser and monitor into Dispensing Device
222
Reports may be printed or faxed to other locations.
220
View Patient Data
Review patient dosing information and events.
224
A variety of report information can be viewed, and data can be compared to other patients. User selectable viewing dates may be set.
232
Data is saved to hard disk or floppy diskettes if data was retrieved from the device.
Save Data
230
Optionally clear device event memory or modify patient/device parameters.
234
240
Exit Program

FIG. 3



User requests to read device data from program menu.
34
Is device data in memory from a previous retrieval which has not yet been stored to disk ?
320
No
Yes
END
Device Data from previous retrieval has not been saved. Do you want to save it before continuing? Yes No Cancel
324
No
Yes
Provide default file name, confirm filename with user & save to disk
328
Retrieve data from device and store in temporary buffer
330
END
Check data for transmission errors and data errors. Do any errors exist?
334
Yes
Inform user that errors exist in data retrieval
338
No
Check disk for for previous data retrieved from this device. Was previous data found?
340
Yes
Merge data from disk with data from device. Keep result in memory and inform user that merge has occurred.
34
No
Store data in global memory to be accessible by all dialogs for reports, calendar, and graphs. Update all open dialogs with new data
348
Display Device Retrieval Dialogue
360
END

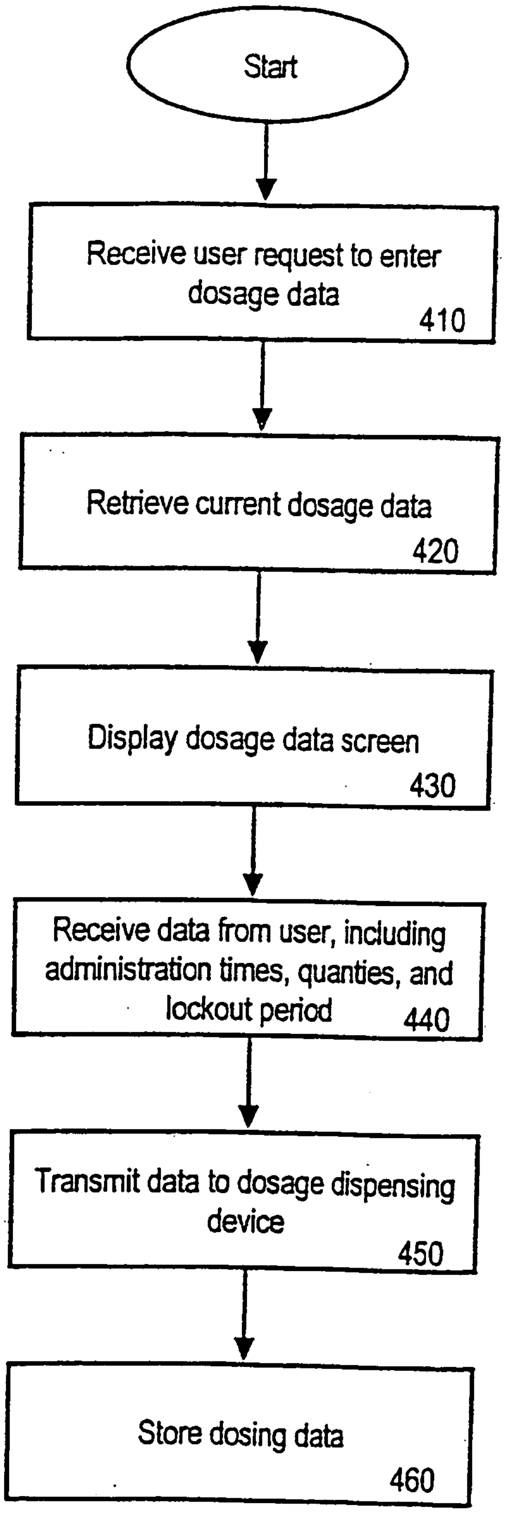

Start
Receive user request to enter dosage data 410
Retrieve current dosage data 420
Display dosage data screen 430
Receive data from user, including administration times, quanties, and lockout period 440
Transmit data to dosage dispensing device 450
Store dosing data 460

Fig. 4

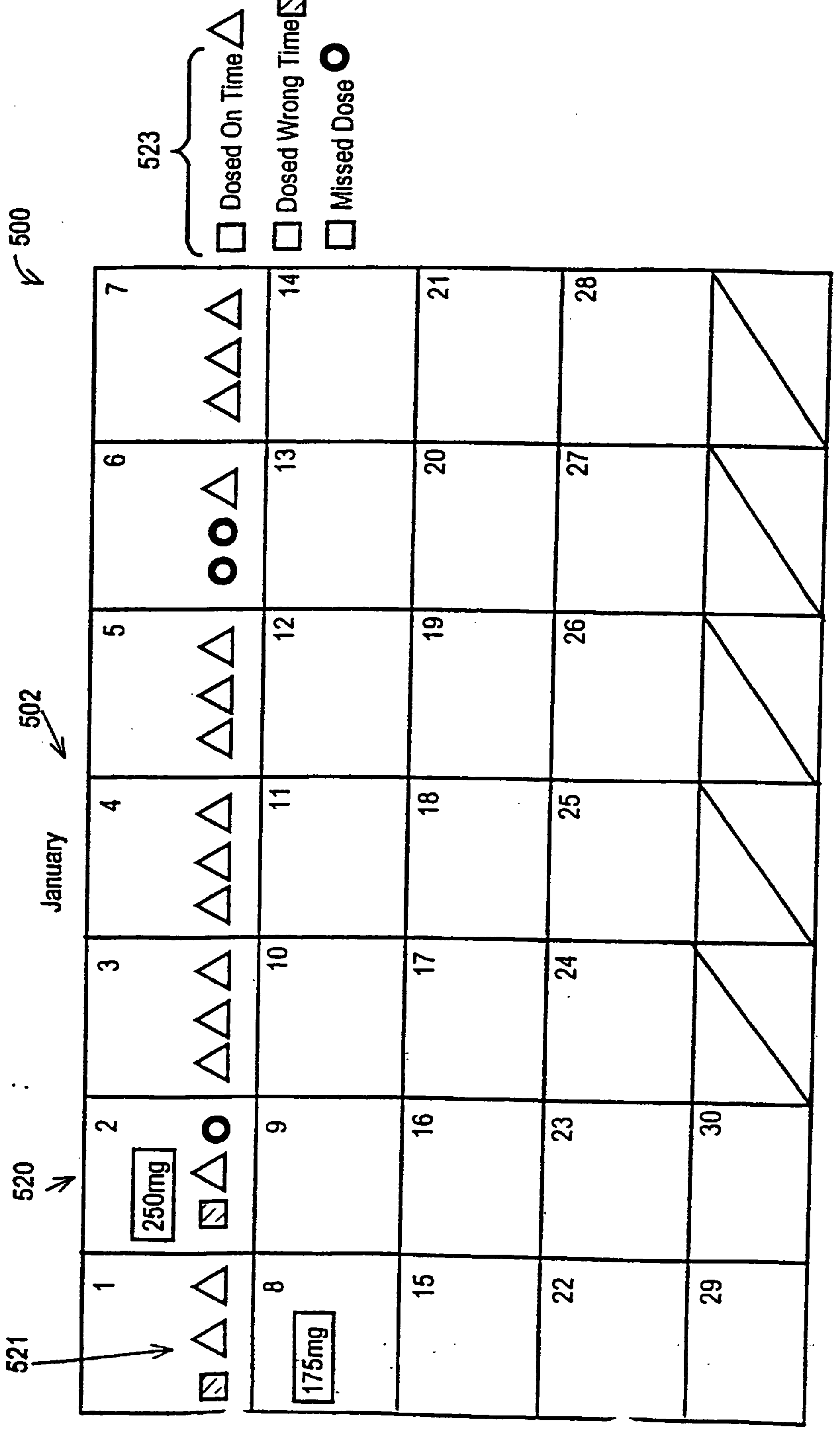

500
523
Dosed On Time
Dosed Wrong Time
Missed Dose
January
502
520
521
250mg
175mg
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30

Fig 5A

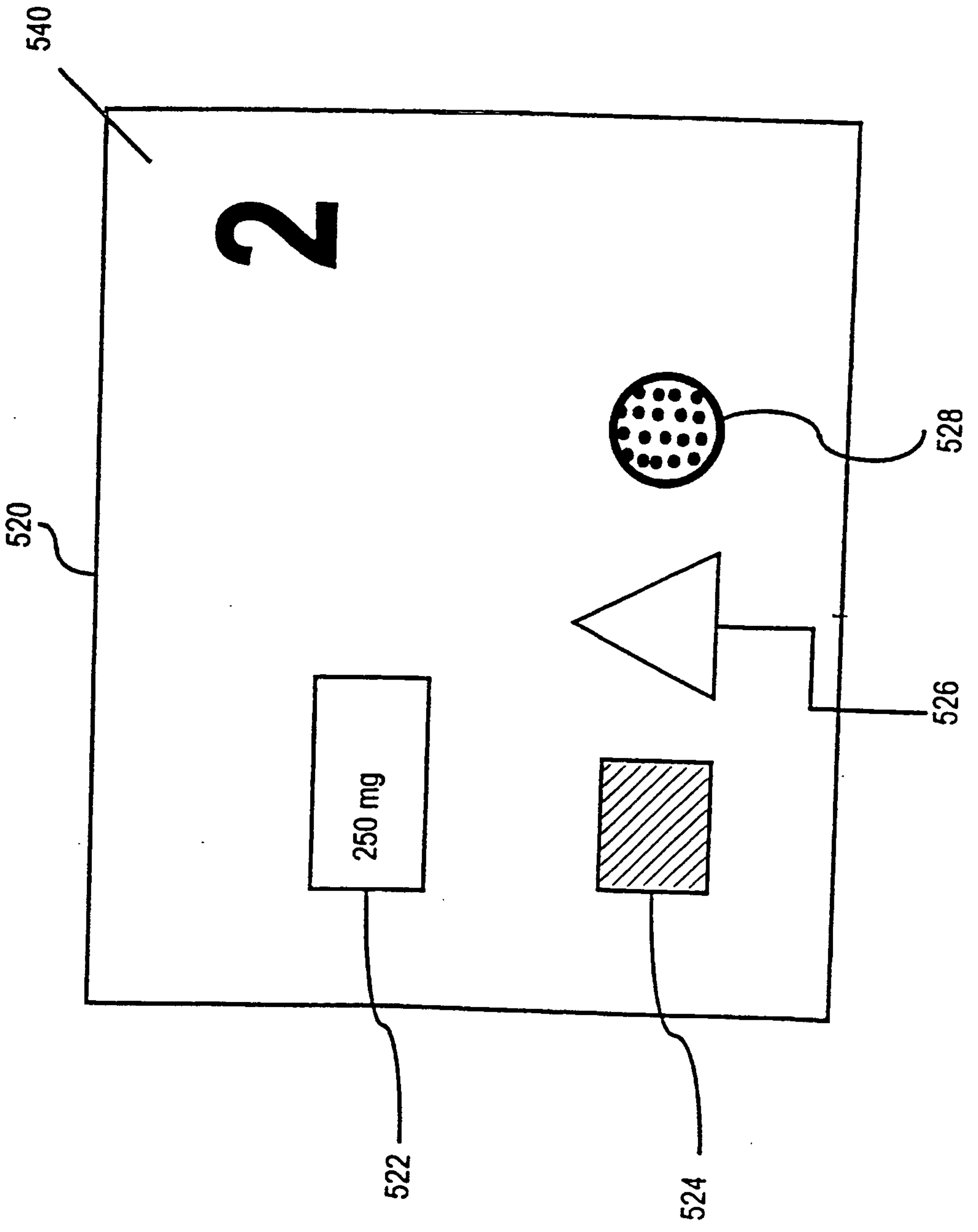


Fig. 5B

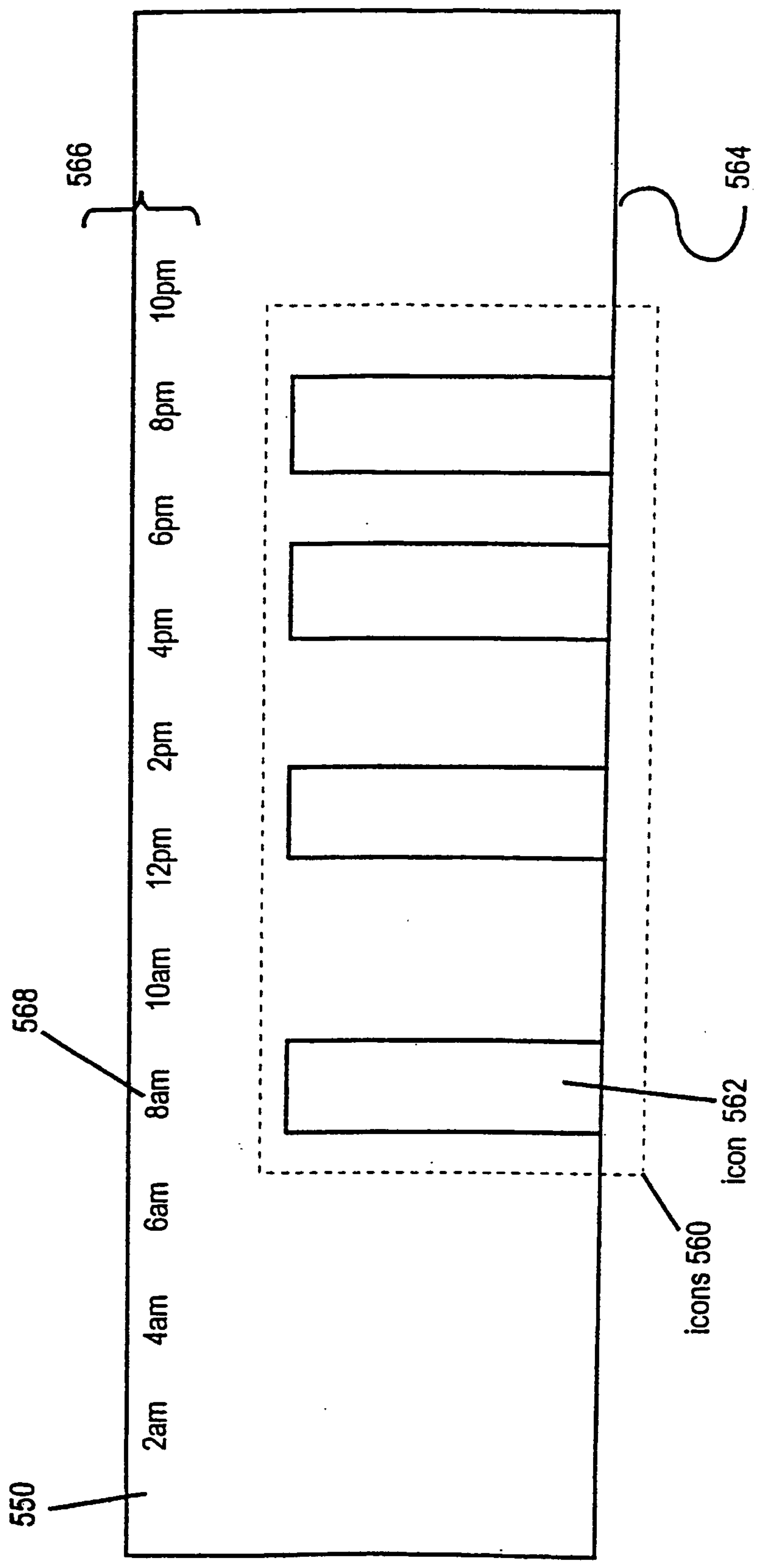

566
564
10pm
8pm
6pm
4pm
2pm
12pm
10am
568
8am
6am
4am
2am
550
icon 562
icons 560

Fig. 5C

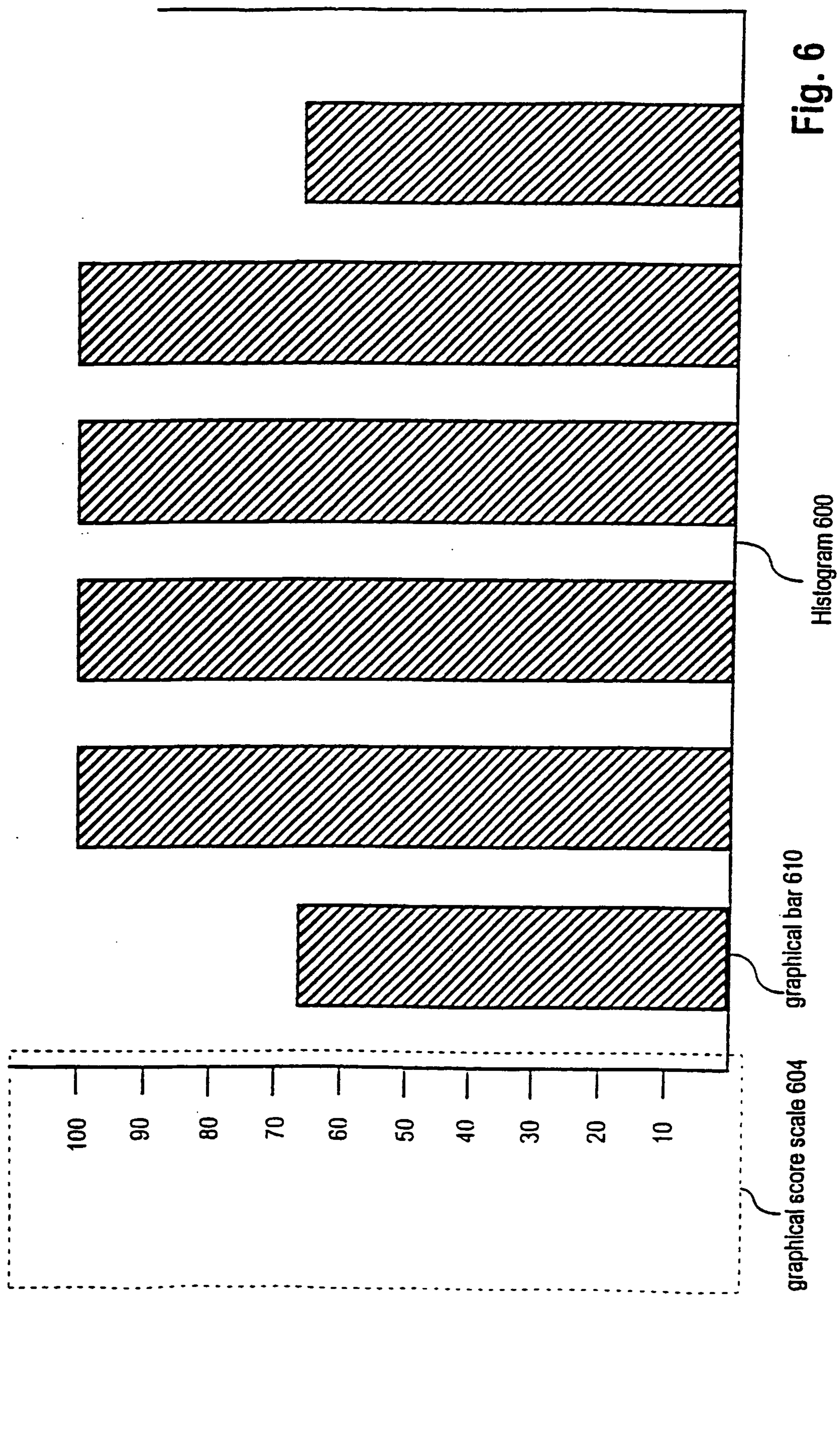

Histogram 600
graphical bar 610
graphical score scale 604
100
90
80
70
60
50
40
30
20
10

Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/22830

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) :G06F 15/42
US CL :364/413.02
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 364/413.02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
APS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,347,453 A (MAESTRE) 13 September 1994, col. 5, lines 53-68 to col. 8, lines 1-7, col. 9, lines 47-68 to col. 12, lines 1-63, col. 13, lines 30-68 to col. 16, lines 1-50.	1-41
X	US 5,016,172 A (DESSERTINE) 14 May 1991, col. 2, lines 23-68 tp col. 4, lines 1-6	1-17
X	US 4,839,806 A (GOLDFISCHER et al) 13 June 1989, col. 8, lines 17-68 to col. 9, lines 1-6.	17

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search 06 JANUARY 1999	Date of mailing of the international search report 07 MAY 1999
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer JAMES TRAMMELL Joni Hill Telephone No. (703) 308-9293

Form PCT/ISA/210 (second sheet)(July 1992)*